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Doubles Steel Castings Production by New Foundry Layout

Increase of Melt from 250 to 500 Tons a Month Is Accomplished Through Adoption of Straight-Line Methods

By E. C. Kreutzberg

Associate Editor, Iron Trade Review

LAST year the Treadwell Engineering Co., Easton, Pa., manufacturer of steel works, rolling mill and special machinery, encountered some difficulty due to the fact that its steel casting department was not able to produce castings in large enough volume to keep pace with the production in its machine shops. It appeared for a time that the company might have to go to the expense of erecting an addition to its steel foundry, but a decision on this point was deferred pending an investigation as to the full production possibilities of the existing foundry. A careful study was conducted over a period of months. Copies were made of the floor plan of the building, and the lines of travel of the castings were indicated thereon. These lines, denoting the travel from the pattern to the shipping stages of the castings, were plotted to scale in colors. Then a study was made, after a checkerboard fashion, to determine what short-cuts could be effected. As one layout after another was made, the possibilities of straight-line production methods grew more surprising. The management ultimately decided on a layout which was put into execution in the spring of 1929. In brief, the company has doubled its production of steel castings without adding any floor space. The melt has been increased from 250 tons to substantially 500 tons per month. It has accomplished this result entirely by the application of straight-line production methods. The small castings, weighing up to 150 pounds, now travel an average distance of 365 linear feet, where-

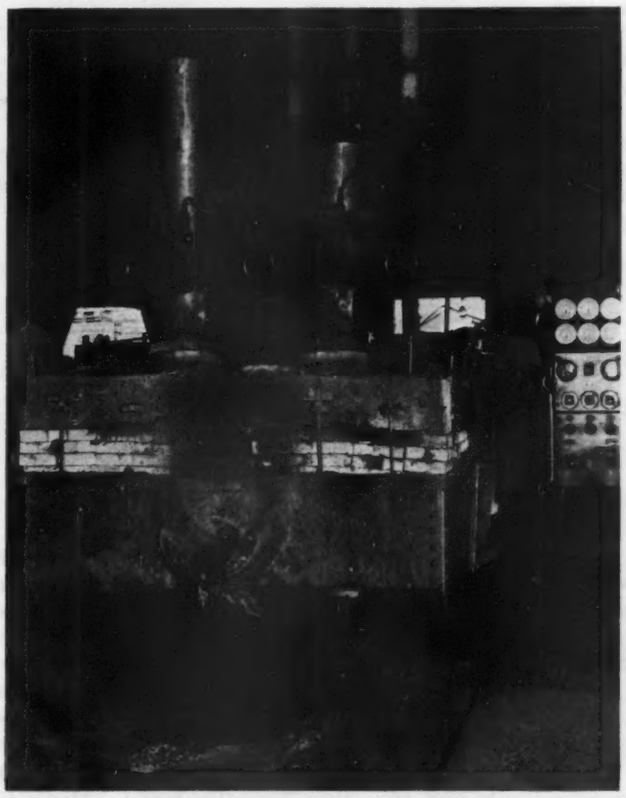

Fig. 1—The first Heroult furnace installed in the United States for production of commercial castings

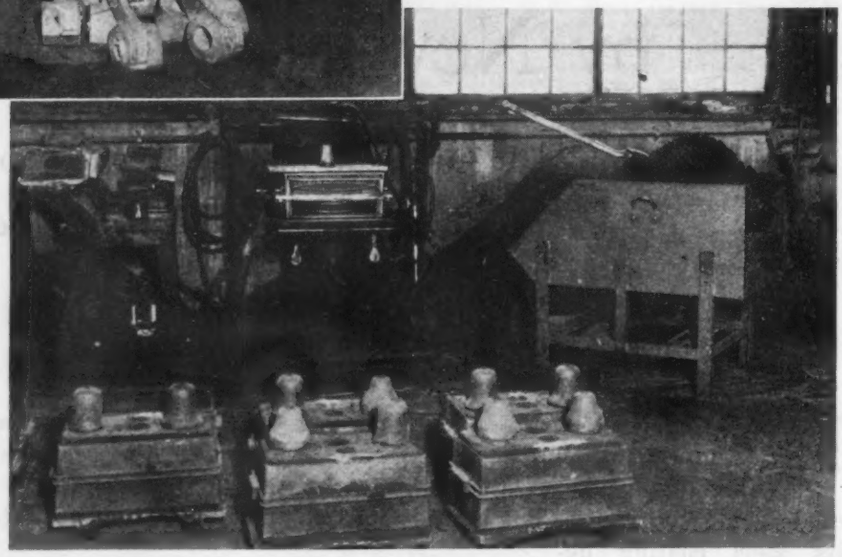

Fig. 2 (Above)—A high-speed grinder has supplanted four low-speed machines. Fig. 3 (Right)—Facing sand is delivered to bench and machine molders in special boxes

as formerly the line of travel for these castings stretched out 1155 feet. Adoption of the present scheme, while not entailing any additional floor space, did entail an extensive rearrangement of the equipment in the foundry, and the installation of considerable new equipment.

Steel castings made at the Treadwell foundry range in weight from 1 pound to about 4 tons. Those weighing 150 pounds or less are classed in the small castings group. The steel foundry, 140 x 220 feet, includes a 70-foot main bay and two 35-foot side bays. The main bay is spanned by two 10-ton overhead traveling cranes. Under the old arrangement, the machine and bench molding floors were located at the south end of the main bay, in a space beyond the travel of the overhead cranes. These molds, to be poured, had to be carried out into the portion of the bay that was commanded by the cranes. They are poured by means of a bottom-pour crane ladle.

Re-allocate Floor Space

The plan for reallocating the floor space called for the location of the machine and bench molders in the west bay. The latter then was occupied in various ways. It contained the small core department, sandblast sand storage, molding sand and core storage, a flask storage and an accumulation of broken flasks the other materials that usually fill up dead space in every foundry. The broken flasks and much of the other material were found to be simply junk. After reclaiming as much of it as possible, the rest was thrown out on the dump. The problems, what to do with the small core department, the flask storage and the sandblast sand and foundry sand storage were worked out in an interesting manner.

The company in recent years had been getting away from dry sand molding to a large extent and this assisted materially in making it possible to find another space for the small core department. Four large drying ovens were located in the east bay. Owing to the more general adoption of green-sand molding, it was found possible to scrap two of these drying ovens. The other two ovens, somewhat obsolete, were coal fired from large fireboxes. They were converted to the use of oil fuel, thus permitting the removal of the old fireboxes. Furthermore, the change to oil eliminated the coal piles which had been occupying considerable floor space. Thus considerable space was made available in the east bay which now is occupied by the department making small cores formerly located in the west bay.

At the same time that the department for small cores was moved, a piece of equipment was scrapped which had been occupying needless space in the west bay. This was a core drying oven of the coal-fired type. In relocating the core department, the company installed an electric drying oven of the most modern type. This oven occupies a small amount of floor space with a large drying capacity. With this oven the company claims to have experienced much better results than with the old coal-fired oven. The operation of the electric oven is uniform. The temperature can be controlled within 1 degree. Not one core has been burned in this oven during the six months it has been in operation. Incidentally, the saving in labor of one man, formerly employed in firing the coal and removing the ashes, practically offsets the increased heating cost resulting from the use of electricity.

Develop New Method of Storing Sand

In clearing the west bay, a much more efficient method of storing sand and other materials was developed. Formerly, a considerable amount of space in the east bay had been occupied by ferromanganese, ferrosilicon and other materials packed in barrels or piled on the floor. A number of concrete bins were constructed in this space. Some of these bins now are devoted to storage of molding sand and sandblast sand, formerly stored in heaps in the west bay. The other bins are employed for storing ferromanganese, ferrosilicon and other materials. The concrete bins, in addition to saving the floor space, make possible a great saving in another direction; the various materials can be taken now in carload lots, thus eliminating the extra costs incidental to crating and barreling small lots.

A small portion of the west bay

floor space had been occupied by the old sandblast room, which extended from the main bay into the west bay. Cars loaded with castings were pulled by the crane into the sandblast room from the main bay. They were removed from the opening in the west bay by car movers. This sandblast room had no sand-reclaiming feature and its operation was costly. The equipment was scrapped and replaced by a modern sandblast chamber, with a sand-reclaiming system. It lies entirely in the main bay, occupying space under the crane cabs not available for molding. The new sandblast room has a door at each end and is provided with two trucks, mounted on tracks. They are equipped with ball bearings, so that they can be moved easily by hand. Loading and unloading of the trucks is done at both ends of the sandblast chamber; while one carload is being blasted, the other car is being prepared to be pushed into the chamber. Savings in man power, crane time and in reclaimed sand have been affected, it is stated, by the installation of this new sandblast unit.

When the west bay had been cleaned, the machine and bench molders were installed in the south end of that bay. The entire molding floor was concreted, giving a good, level setting for the molds and making it easier to keep the foundry clean. The molds are poured from hand-ladles, on the molding floor, thus preventing waste of time and space formerly incurred in moving the molds to where they could be poured from bottom-pour crane ladles. Elimination of bottom pouring has eliminated trouble due to breaking out of molds, cutting of gates and to occasional spills.

Large down-gates, necessitated by pressure of steel from the bottom tap ladle, have been eliminated, thus making it possible to pour the molds with less steel. A roller bearing truck on an industrial track extending from the main bay into the west bay brings the hot metal into the west bay in a teapot type ladle with capacity of 4000 pounds. This ladle is filled at the electric furnace and carried to the truck on which it is pushed into the west bay. In addition to the savings mentioned, the present method of pouring in the small castings department takes much less crane time than under the old bottom pour method.

West Bay Rearranged

From the molding department, the small castings proceed down the west bay through various stages until they come to the shipping department at the end of the bay. After they are shaken out the castings are placed in small steel boxes which rest on skids. These boxes are picked up by an electric lift-truck and taken to a roughing tumbler. This tumbler formerly was in the main bay, but has been moved into the west bay to save travel of the castings to it. After rumbling for a period of about one hour, the castings are removed and placed in a space across from the rumbler where the heads and gates are removed by an oxyacetylene torch. They then are reloaded into the boxes and conveyed by the electric lift trucks to the next station, where the grinders are located, and are ground.

Special attention was given to grinding the small castings and savings in several directions were effected. One of the two grinding units is a high-speed double-end grinding stand of a new type. The other is an 18-inch swing grinder; used particularly on the castings too heavy to be handled conveniently at the double-end stand. The new double-end stand is provided with elastic bonded wheels operated with safety at 9000 to 10,000 surface feet per minute, compared with 5000 for the old double-end grinding stands. The new high-speed stand has supplanted four of the old double-end stands. The grinding department, it is stated, now does more work, with less equipment and less labor, and with a great saving in the amount of floor space required.

After the grinders come the air chippers. A welding booth is located in the main bay with an extension into the west bay. The welding booth occupies the space in the main bay formerly occupied by the rumbler which was moved into the west bay. The welding booth is commanded by

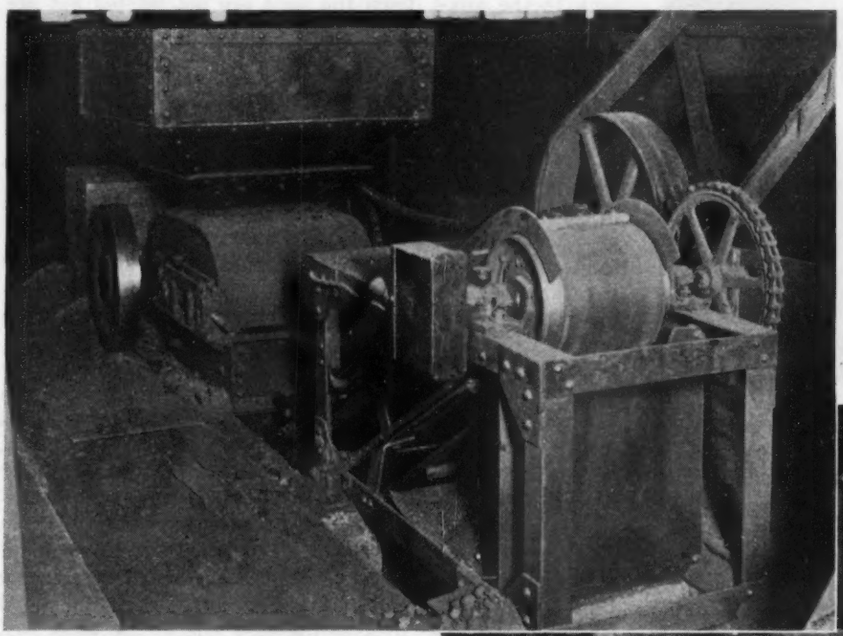

Fig. 4 (Left)—A crusher and magnetic separator are used in the sand reclaiming unit. Fig. 5 (Below)—Concrete bins have been built in the storage department

Fig. 6 (Right)—General view of small castings department located in the West bay. Fig. 7 (Below) —Hot metal is brought into the West bay on a roller bearing truck running on a narrow-gage track

the cranes so that heavy castings produced in the main bay can be taken to it conveniently. The extension into the west bay makes it also readily accessible to the small castings. Next, in the west bay, is a small department for dressing welds and for final chipping.

When the castings have been cleaned thoroughly, they are given a heat treatment after which they are placed in the finishing rumbler, a new piece of equipment of standard type. Then they are taken to the inspectors' table and are checked for dimensions, shrinkage, etc. They finally are delivered, at the north end of the west bay, to the scales, for shipment to one or another of the company's machining departments.

Facing sand is prepared in the east bay. Under the new layout the problem arose of efficiently transporting sand from the mixers to the molders in the west bay, and getting the excess heap sand back to the mixers. A concrete runway was extended from the main bay terminal of the hot metal track to the concrete floor in the east bay on which the sand mixing apparatus and the core departments are located. For transporting sand, boxes made of steel with long legs were built by the company. The electric trucks can get under and lift them, and they are high enough so that the molders can get at the sand with minimum effort. At full box with a capacity of 18 cubic feet always is on hand at each molding bench.

In somewhat the same manner the problem of getting the excess burned sand back to the mixer was solved. Gravity dump buckets with capacity for one-half cubic yard each, are placed on skids in the west bay, and loaded with the excess sand. These buckets are transferred by the electric truck into a position on the concrete runway where the traveling cranes can pick them up. The crane dumps the contents of the buckets into the hopper of the sand-reclaiming machine in the east bay.

From the hopper, the sand is fed through a set of crushing rolls which breaks up the lumps. Then the sand drops on a belt which carries it over a magnetic separator to remove nails, wire, shot, etc. The sand then falls into an elevator boot and is carried to a vibratory screen provided with a dust collector. The fines separated from the sand are not wasted but are used in the core mixtures. The resulting molding sand, minus the fines and the dust, goes back into the facing. Much of the sand-reclaiming apparatus was designed and built by the company.

Describes Floor Molding

Floor molding of large castings in the main bay is done substantially the same as before. Savings in space have made it possible to add five more molders to the crew in the main bay. Shifting the flask storage from the center portion of the main bay, to the space where the machine and bench molders formerly did their pouring, has made space for a shakeout floor for the large castings. This shakeout floor is adjacent to the sandblast chamber. The chippers, instead of being strewn over the entire north end of the main bay, have been moved over to the east side of the main bay, where there is provided a straight, orderly line of benches and compressed air connections.

In addition to getting out a greater volume of production from the same space, with a resulting lower cost per pound, the company finds that the changes effected make it possible to operate the steel foundry with less supervision. With all details of the foundry operations clearly understood, and all moves in accordance with a set schedule, there is less opportunity

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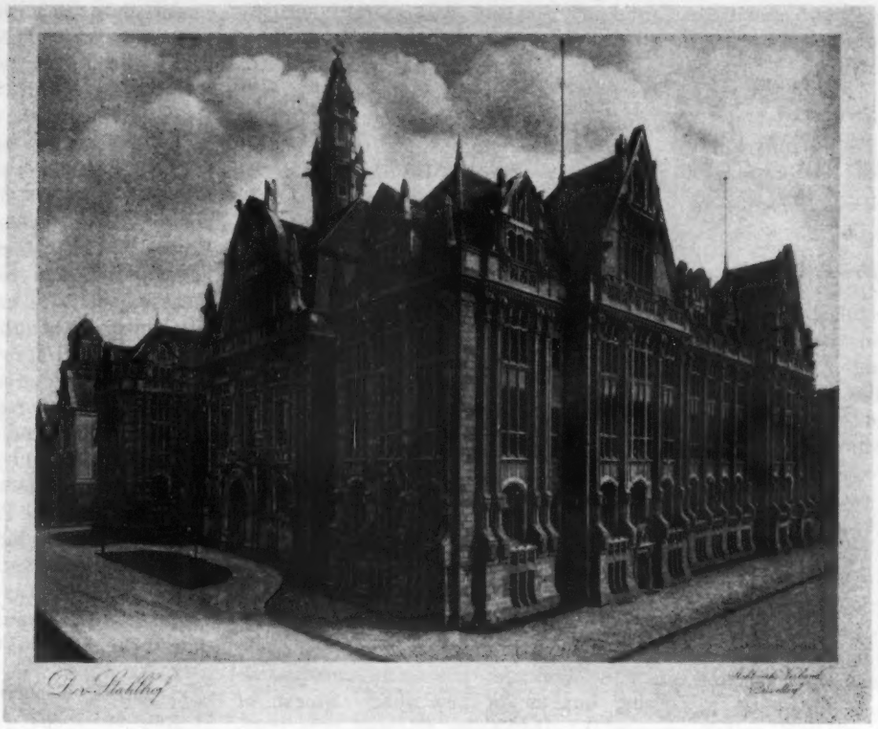


The Stahlhof, head offices of the Stahlwerks Verband, the steelworks association of Germany

German Industrial Situation Causes Much Anxiety

By Vincent Delport

European Representative, Iron Trade Review

RECENT reports have indicated that Germany is experiencing a difficult period, owing to shortage of capital. These reports have been confirmed by American observers. The original causes of this state of affairs are well known to, and have been explained by, economic experts. Of course, the whole situation can be broadly regarded as resulting from the war and the treaty that followed. At present the business outlook is viewed by leading German industrialists with some anxiety. The fact that Krupp's have found themselves compelled recently to reduce operations and dismiss about 1000 hands shows that the situation is serious. Other important steel concerns also have had to curtail operations.

It is interesting to note that many people in Germany, in and out of business, render the administration partly responsible for the present scarcity of capital. It is almost the unanimous opinion that officials in the state, the provinces and the cities are spending money right and left to no useful purpose, instead of making economies and reducing taxation. Many see this as a result of a growing tendency to socialism, and the more pessimistic, arguing that socialism is on the increase, see no future hope of bringing prosperity back into Germany. In discussing Germany's burdens, it has even been said that the Young annuities are a small item in comparison with the extravagant expenditure of the administration. These comments are given as indicating the attitude of mind of many who are responsible for the success of large business undertakings.

That German industry and trade is handicapped by insufficient capital and restricted credit is unquestionable. Production in staple industries is being curtailed; unemployment figures, which at the end of September reached about 750,000, are nearing a million; money can be borrowed only at 12 per cent. It must not be forgotten, however, that the present situation arises after

Steel Entente Quotas

Annual Basis Production Quota of the Steel Entente for the Five Original Member Countries

	Metric tons
1926	
Fourth quarter	29,287,000
1927	
First quarter	27,287,000
Second quarter	29,287,000
Third quarter	29,287,000
Fourth quarter	29,287,000
1928	
First quarter	29,287,000
Second quarter	29,287,000
Third quarter	29,287,000
Fourth quarter	29,287,000
1929	
First quarter	29,287,000
Second quarter	31,287,000
Third quarter	32,295,770
Oct. 1 to Nov. 1	32,295,770
Nov. 1 to Dec. 31	29,066,190

In addition, slightly over 2,000,000 tons are allocated to Czecho-Slovakia, Austria and Hungary.

a period of activity and comparative prosperity. Conservative observers, who have been studying the position of the country over a lengthy period, are of the opinion that underlying conditions are sound, and that if only fresh capital can be reintroduced into the country, the future can be faced with confidence.

Enjoys Prosperous Period

While, early in October, there was a sensational drop in values on the Berlin stock exchange, this does not directly influence the concerns themselves, or the trend of industrial activities. In fact, since January Germany has been producing steel at a higher rate than last year, and the Vereinigte Stahlwerke A. G., or United Steelworks corporation, has been enjoying a most prosperous period. This concern is Germany's largest producer of coke, pig iron and steel, and a brief review of its activities up to the late summer will show that conditions in the iron and steel industries have been fair.

The coke output of the United Steelworks has nearly doubled in three years, and, until recently and despite general unemployment, more workers have been taken in. With regard to iron and steel activities, while there has been some slackness in home business, this has been more than offset by the volume of foreign sales. The works have enough orders on books to keep them going well into the fall. The turnover in the quarter ending June 30 was a record. Sales aggregated 417,552,000 marks ($100,000,000), compared with 352,111,000 marks ($84,000,000) in the preceding quarter, and 339,800,000 marks ($81,000,000) in the second quarter of 1928.

This notable gain was mainly due to increase in exports. These were 39.1 per cent of total sales in the second quarter, as against 36 per cent in the first. The quota of the United Steelworks corporation in total German iron and steel exports has increased from 47 per cent to 48.6 per cent. In fact, export sales in the second quarter of this year were larger than in any previous quarter. This increase in the company's exports continued until June. Since then export sales have slackened, but still are well ahead of those of a year ago.

Through rationalization and careful administration, the position of the United Steelworks corporation is strong. The Rheinische Westphalische coal syndicate, in which the company has a sales quota of 22 per cent, sold 30,076,000 metric tons of coal in the second quarter of this year, compared with 25,811,000 tons in the corresponding quarter of last year. Stocks of coal at the Ruhr pitheads are comparatively low. Heavy demand for coke has considerably reduced the corporation's normal stock, and the concern has found full justification for its heavy expenditure on new cokeries in the past two years. In the year Oct. 1, 1927 to Sept. 30, 1928 alone, its coke production was increased from 8,200,000 tons to 9,400,000 tons, a gain of 14.6 per cent.

Has Unbroken Foreign Demand

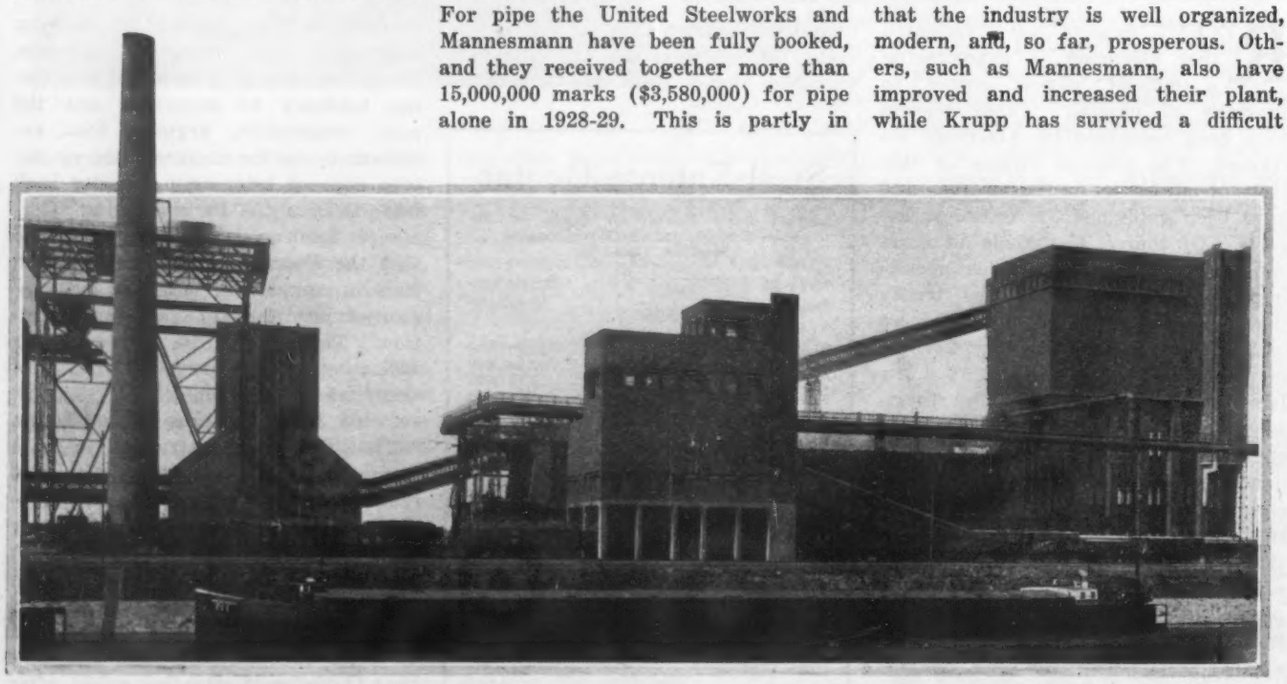
Both for pig iron and steel the corporation has had an unbroken foreign demand. In the domestic market also there have been considerable activities. For pipe the United Steelworks and Mannesmann have been fully booked, and they received together more than 15,000,000 marks ($3,580,000) for pipe alone in 1928-29. This is partly in conjunction with the construction of pipe lines for the distribution of Ruhr gas to cities and corporations.

Since its foundation in 1926, the United Steelworks corporation has spent over 300,000,000 marks ($71,800,000) on new organization and plant, and it now is one of the best equipped iron and steel enterprises in Europe. The rationalization program being practically completed, improvement expenditure can be substantially cut down, although in such a large undertaking, improvements are continually being effected. Among the latest additions recently started are two blast furnaces, one of which has a capacity of 1000 metric tons, a new rolling mill for merchant bars, and a Talbot furnace. The Hamborn steel plant now is producing at the rate of 200,000 tons of steel a month, against 115,000 tons average in April-September, 1926. In January, 1929, a record output of 207,000 tons was attained.

Start Experimental Work

The corporation has interested itself in certain new processes and new lines of production. In conjunction with Krupp, it has formed the Eisenschwamm company, with the object of producing steel directly on the patents of the Norsk Steel Co., of Sweden. The works are of an experimental nature and will start in 1930, producing about 40,000 tons a year. This output will be used mostly instead of scrap, when high-grade steel is to be manufactured. The corporation also is making extended use of Armco iron.

This record of Germany's leading iron and steel concern tends to show that the industry is well organized, modern, and, so far, prosperous. Others, such as Mannesmann, also have improved and increased their plant, while Krupp has survived a difficult



Battery of coke ovens, 6 meters high, at the Gelsenkirchen works of the Vereinigte Stahlwerke A. G.

period of readjustment from war manufacture to peace supplies. These and others constitute for Germany a valuable asset.

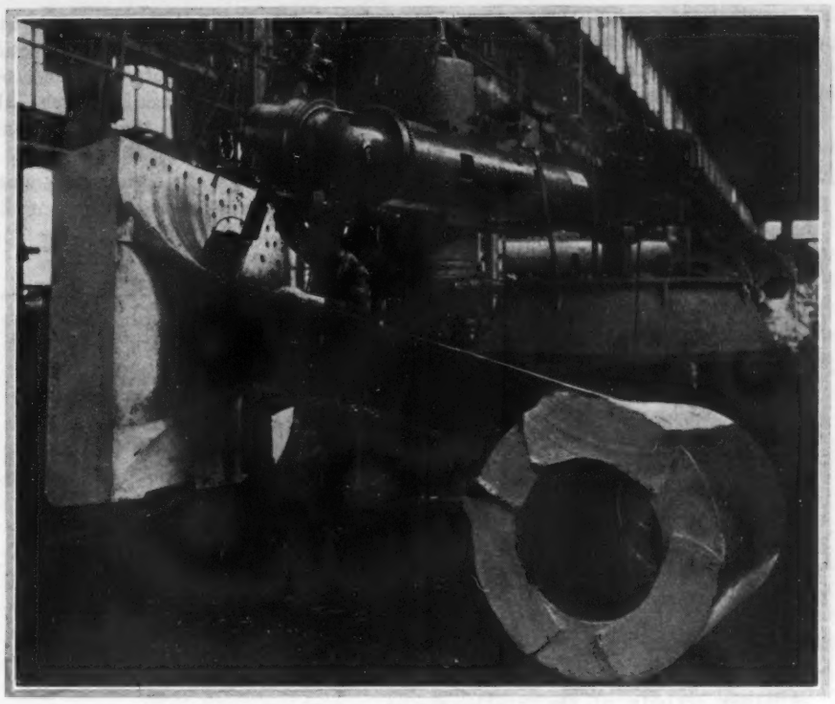
There remains, however, the fact that at present domestic business has subsided for reasons already mentioned, and export trade also is falling off, both in volume and in price. Herr Kloeckner, recently addressing the annual meeting of the Kloeckner works, pointed out that the export price of merchant bars has dropped from high point of £6 5s ($30.25), early in the year, to £5 4s ($25.25). He stated that consumers in the Far East and India last year had made heavy purchases, and now are sufficiently provided for. Now all markets reflect an attitude of reserve on the part of buyers. The speaker went on to say that the formation of international selling syndicates, if arrived at, would cause prices to rise and remain more stable.

Entente Structures Shaky

During the past two years the question of international selling syndicates has made little progress, and, in fact, the whole structure of international ententes now is somewhat shaky at its foundation, owing to the uncertainty of the renewal of the European steel entente. Since the formation of the entente, rumors occasionally have been spread that it would be broken up because certain members were not satisfied with the terms applying to them. The entente, however, has functioned without a break up to the present, although at a number of meetings the question of quotas and penalties has been raised, mainly by Germany, who, having almost constantly produced in excess of her quota, has been the most penalized member.

The situation has reached a point where it now is generally conceded that Germany's claim is justified, and there is no doubt that if that were the only point to be discussed, a satisfactory arrangement would be arrived at. It is almost the unanimous opinion among steelmakers of France, Belgium, Luxemburg and Germany that the entente has been useful. While it is admitted that the control of production has not always been sufficient to maintain prices at a satisfactory level, it is felt that the very existence of the entente has served to bring about a spirit of co-operation and understanding between the representatives of the various producing nations, and it can be said that this feeling is universal.

The existence of this feeling should be of sufficient assurance that concessions would be made by representatives of the various countries in order to satisfy Germany's claim. From that standpoint it can be said that the life of the entente is not in danger, but the stumbling block is to be found in the fact that German domestic syndicates are coming to expiration early next year, and there are reasons to believe that these syndicates may not be renewed. Should this be the case, it would be extremely difficult to re-establish the European entente on a stable basis. If the German syndicates are disrupted, control of production in Germany will be rendered in the practicable and consequently control of production for the steel entente as a whole also will be made impossible.



Large steel castings at works of Bochumer Verein Bochum, controlled by the Vereinigte Stahlwerke A. G.

The principal difficulty in regard to the German syndicates lies in the fact that one of the larger concerns outside the United Steelworks Corp. has materially increased its capacity of steel production, owing to plant extensions which have been completed during the past year. This concern used to purchase annually about 100,000 tons of steel from Krupp and 40,000 tons from the Vereinigte Stahlwerke for the manufacture of tubes for Germany and Great Britain respectively. Now it is reported, the concern intends to buy in Great Britain the steel necessary for its British works, and it manufactures enough for its own needs, so that it no longer requires these tonnages from the two other concerns.

When negotiations for the prolongation of the German syndicates take place, it is expected there will be great difficulty in apportioning the quotas, because considerable resistance to the claims of the firm in question for a high quota is expected. At the same time, Krupp's have threatened to build a large tube mill themselves, in order to consume the steel which previously was sold to the other concern, and should this new plant be constructed, the situation would become further complicated as far as the quotas of the German tube syndicate are concerned.

Solution Appears Difficult

Thus it seems that the solution of the German problem will be found more difficult than that of the European entente, and the latter depends largely on the former. It is impossible, for the time being, to forecast definitely the outcome of this position, but in view of satisfactory results obtained through the various syndicates in recent years, it can be assumed that last-minute efforts will be made to preserve the principle of the existing structure. In fact, it is considered by certain members of the German steel organization that, even should the German syndicates be broken up in their present form, some means would be found to preserve the European entente.

There have been no recent changes in the organization of the German syndicates, which continue to be grouped under the Stahlwerks Verband, or association of steelworks. These syndicates include the Rohstahlgemeinschaft, which simply controls the output of its members and which comprises about 95 per cent of the steel-producing capacity of the country. This raw steel association apportions the quotas

of production among the works and collects penalties from those works which exceed their quota. It is purely a production-controlling agency.

The selling syndicates, which also come under the supervision of the Stahlwerks Verband, comprise: the A-products union, which controls the sales and prices of semifinished steel, structural steel, and railroad track material; the bar union; the plate union; the hoop and band union. Outside the Stahlwerke Verband, but working in close co-operation with that organization, are the tube union and the wire rod and wire products union. All these syndicates apportion orders between the mills and fix minimum prices. The raw steel association steel entente, and the tube and wire tional tube and wire rod syndicates. The A-products union is affiliated with the international rail association for the sales of railroad rails.

Develops Domestic Consumption

Another activity of the Stahlwerks Verband is to develop the consumption of steel in Germany by the methodical advertising of its various possible uses. A bureau of information and propaganda is in charge of this work, and issues various pamphlets explaining the advantages of using steel in many directions in which the consumption of steel has been found deficient. Some very good results have been obtained by the bureau. For instance, the consumption of steel for buildings, exclusive of industrial plant and bridges, etc., increased from about 30,000 tons two or three years ago to 150,000 tons last year. A considerable increase also has been noted in the use of steel for furniture, doors, etc. Similar bureaus exist in France under the supervision of the Comite des Forges, and in Great Britain, and these organizations co-operate, as they believe that by widely advertising the use of steel, even in foreign countries, the industry as a whole will greatly benefit.

It will thus be seen that while the shortage of capital in Germany and the restriction of orders by the railroad companies, shipyards, etc., are causing some anxiety to steel producers and manufacturers, efforts are being made to counteract these unfavorable factors, and, on the whole, production is being fairly well maintained. From the point of view of raw materials, German iron and steel producers have sufficient coal and coke, and their supplies of iron ore are assured through long-term contracts with Swedish mines. They also find no difficulty in obtaining certain supplies of Wabana ore, and, of course, a considerable tonnage of iron ore from Lorraine still is used and can be obtained without difficulty. Although there is no actual working arrangement in connection with the exchange of coal and ore between Germany and France, the markets are free and transactions are normally conducted.

Germany has just about enough scrap to meet requirements of its iron and steel works. There are however, restrictions on exports, just as in France. There may be a little difficulty in the future with regard to the scrap position, because a commercial treaty is being negotiated with Poland, and it is understood that if this should materialize, a certain tonnage of scrap will be delivered annually to Polish steelworks; consequently, Germany then will have to import a certain amount to meet her own needs. However, the position is not acute.

As has been explained, shortage of capital hampers the industry most, not so much that the iron and steel concerns actually need capital for themselves, but because the buying power of the country is diminished. In this respect the position in Germany in just about the reverse of that in France, because while France is not particularly troubled with credit restriction, iron and steel works in that country find it extremely difficult to operate on account of labor shortage, and many works which had booked enough orders to justify operating to capacity have had to reduce operations because they could not muster sufficient labor. On the contrary in Germany, money is needed, and now that production is somewhat curtailed, unemployment, even in the iron and steel industry, tends to rise.

If the German iron and steel industry were fully occupied, there is no doubt production would exceed all previous records, because the capacity of steel production in Germany has increased during the past two years. While a number of blast furnaces and steel furnaces have been constructed since 1927, the increase in productive capacity has not reached large proportions, because at the same time, old and uneconomical plants have been broken up, and in the process of rationalization certain works have been definitely closed. While it is impossible to give a precise figure of the capacity of production, since the definition of the term itself is not the same in all countries, it may be assumed that, if the German steelworks were working to capacity, the production would reach from 17,000,000 to 17,500,000 metric tons.

Depends Largely on Exports

As has been seen, Germany depends to a great extent on export business, and throughout this year the iron and steel export trade has been fairly satisfactory, at least from the standpoint of tonnage. At the time the American export association was reported to be opening offices in Germany, some anxiety was felt by German producers, but this anxiety has subsided, since, apparently, the activities of the association have not been such as to make important inroads in German domestic business.

Those industrialists who are given to moderate optimism believe that present difficult conditions will be overcome, and that the German iron and steel industry should see better times. This is on the assumption that good understanding will be maintained between Germany and her neighbors, not only politically, but also on economic matters. As far as interior conditions are concerned, the wage agreements arrived at last year still are in force, and little trouble is expected.

Production costs still are increasing

German Steel Works Organization

STAHLWERKS VERBAND
(Steelworks' association)

Rohstahlgemeinschaft*
(Raw steel union)
Controls production only and allocates output quotas.

A-Produkte-Verband*
(A-products union)
Controls sales of semifinished steel, structural steel and railroad track material. Fixes prices and allocates sales quotas.

Stabeisen-Verband
(Bar union)
Controls sales of merchant bars. Fixes prices and allocates sales quotas.

Grobblech-Verband
(Plate union)
Controls sales of plates. Fixes prices and allocates sales quotas.

Bandeisenvereinigung
(Hoop and band syndicate)
Controls sales of hoops and bands. Fixes prices and allocates sales quotas.

ROHEISEN-VERBAND
(Pig iron association)
Controls production and sales. Allocates quotas.

WALZDRAHT-VERBAND*
(Wire union)
Controls sales of wire products. Fixes prices and allocates quotas.

ROHREN-VERBAND*
(Tube union)
Controls sales of forged tubes. Fixes prices and allocates quotas.

*These syndicates are affiliated to the International Syndicates.

somewhat, but not to the extent that was prevailing a year ago. It is believed, however, that the limit has not quite been reached yet. It is not believed that the Young reparations settlement will have much influence on the iron and steel industry directly, although restriction of reparations deliveries may have some effect, but this, of course, applies mostly to manufactured products. With regard to outside markets, trade with Russia still is looked upon as uncertain, although possibilities of this market are not overlooked. As to German markets in the Far East, India and South America, it is felt that when the present period of quiet has spent itself, business in these countries should again expand, with profitable results.

One problem remains uncertain and may have some effects on the trend of business soon; it is the result of the coming negotiations with regard to the Saar territory. It is generally anticipated, both in France and Germany, that the Saar will return to Germany. This territory has a production of steel of nearly 2,000,000 tons annually, and for the present most of the outlet for this steel is divided between Lorraine, in France, and the southern provinces of Germany. Under present conditions, the Saar enjoys a special status and can export a considerable tonnage of steel and steel products free of duty. Once the Saar again becomes part of German territory, a special arrangement will have to be made with regard to tarriff duties, and a period of transition will have to be provided for, in order not to unbalance trade between the Saar and the neighboring countries. It is generally expected that a satisfactory agreement will be arrived at because while the interests on both sides are somewhat divergent, no satisfactory arrangement can be reached unless concessions are made on both sides.

Iron Foundrymen Install Accounting System

A standard cost accounting system, which has been under development by the Gray Iron institute for some time, is now completed and has been sent to members, according to Arthur J. Tuscany, manager of the organization. The new system is expected to prove of considerable value to members as well as to the whole industry. The system includes several innovations in foundry accounting.

The institute now has plans under way for establishing recommended practices which for the first time will classify gray iron by its chemical and physical properties. Certain definite uses will be recommended for each classification established. A practical merchandising program is nearing completion and will be announced as soon as the standard accounting system has become sufficiently well established.

Charles E. Mitchell has been appointed associate manager of the institute to assist Mr. Tuscany in the executive work. Mr. Mitchell has had a wide experience in accounting, merchandising and association promotional work. He has traveled throughout the country as a salesman, sales organizer and sales director, and has been accountant and office manager of a large corporation. Mr. Mitchell resigned as manager of a local Cleveland association to accept the new appointment.

During January the Gray Iron institute will hold sectional meetings in middle western foundry centers. A series of meetings in the East will follow in February and March, and as quickly as time will permit, sectional meetings will be held throughout the rest of the United States and Canada. The standard accounting system and the preliminary steps in the merchandising program are the subjects for consideration at these meetings.

To Publish New Boiler Welding Code Soon

Welding of high-pressure boilers under certain conditions soon is to be sanctioned by the boiler code committee of the American Society of Mechanical Engineers, according to C. W. Obert, secretary of the committee, who spoke recently before the Philadelphia section of the American Welding society.

Mr. Obert consulting engineer, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., said welding engineers could be assured that their interests were nearly identical with the interests of the code committee, and that it merely remained for certain details to be worked out before a comprehensive new code would be published. California has advanced more rapidly than the rest of the country in authorizing boiler welding. A California code first proposed in 1925 and placed in effect Jan. 1, 1928, covers the welding of boilers up to 60 inches diameter and up to 200 pounds pressure. The American Society of Mechanical Engineers now is planning to bring out a code almost identical with the California code, according to Mr. Obert. One of the modifications, however, will be that a unit stress of 8000 pounds per square inch will be used in designing for a double-V weld. Ohio has prepared a code also based on the California code, which will go into effect Jan. 1, 1930.

E. R. Fish, manager of engineering, Combustion Engineering Corp., New York, in an illustrated paper presented at the same meeting described the actual progress in boiler welding.

Foundry Layout Doubles Castings Production

(*Concluded from Page* 1618)

among the employes for making mistakes.

An interesting feature of the Treadwell Engineering Co.'s steel foundry is the 3-ton, electric furnace of the heroult type. It is of the original rectangular shape and is said to be the first electric furnace installed in the United States for the commercial production of steel castings. The first heat was melted in this furnace September, 1911, and the furnace ever since has been in steady operation.

W. R. Forrester, superintendent of the Treadwell Engineering Co. steel foundry worked out the application of straight-line production methods described in this article.

Malleable Iron Institute To Broaden Work

The regular annual meeting of the Malleable Iron Research institute, was held at Cleveland, Dec. 11. Action was taken at this meeting to enlarge the activities of the institute. Laboratory and metallurgical research work, which previously has been on a basis of improving the quality of product and efficiency of plant operation, will be enlarged and will be supplemented with branches in shop practice and inspection service. A program of market research also will be undertaken which will include studies in new uses and applications, specifications of materials for specific purposes and market conditions as affecting the uses of malleable castings. The personnel of the institute will be increased by additional administrative, executive and field engineers to conduct the enlarged activities.

The following officers were elected to serve in 1930: President, R. R. Fauntleroy, Moline Malleable Iron Co., Moline, Ill.; vice presidents, John G. Malnoski, Muncie Malleable Foundry

Co., Muncie, Ind., and Joseph P. Kennedy, Baltimore; secretary-treasurer, Robert E. Belt, Union Trust building, Cleveland.

New Booklet Discusses Welded Pipe Design

A new booklet, "Fabrication of Welded Piping Designs," intended for the use of the executive welder foreman, and welder, has just been published by the Linde Air Products Co., New York. This new publication is to enable the men of the trade to apply successfully the fundamental designs described in a former booklet "Design Standards for Oxwelded Steel and Wrought Iron Piping."

The booklet just issued contains procedure controls for line joints and fittings, templet layout for pipe fittings and tables for estimating costs. It is completely illustrated with sketches, and goes into considerable detail to give a most comprehensive treatment of the whole subject of welded pipes. A supply of these booklets for district sales office use can be obtained from the technical publicity department, Linde Air Products Co., New York.

Foundrymen to Combine Two Publications

Beginning with January, 1930, the American Foundrymen's association will introduce a *Transactions and Bulletin*, a monthly publication replacing and combining the present quarterly *Bulletin*, and the annual bound volume of the *Transactions*. The new publication will be in magazine form, and will be mailed to all members as a part of the service of the association.

As the new name implies, it will consist of two sections. In the *Transactions* section will be found the material formerly contained in the annual bound volume. This includes convention papers and discussions, committee reports, and business proceedings. Although the sphere of the old annual volume will be covered completely, members so desiring may continue to receive an annual bound volume. One of the chief advantages of the new publication lies in the fact that it permits more frequent and uniform distribution of papers and reports.

The *Bulletin* section will devote more attention to news of committee activities, convention notes and association activities. One department will be reserved for news of local and district foundry activities and abstracts of papers read at these meetings.

The editorial staff of the old *Bulletin* has been expanded with the addition of W. M. Maloney formerly editorial representative of IRON TRADE REVIEW and the Penton Publishing Co., in Cleveland and Chicago. Mr. Maloney assumed his new position early in October.

Welds Cupola Extension with Oxyacetylene

WHEN a cylindical extension was needed for a cupola the welding shop of a Minnesota iron mine demonstrated the extent to which oxyacetylene welding and cutting may be used in maintenance work. The job was found to be easy with oxyacetylene welding. Four pieces of 3/16-inch plate, 4 feet long, were formed by rolling into half cylinders. These were then welded along the longitudinal seams to form two cylinders each 4 feet long and 37 inches in diameter, and which in turn were joined to one another by a circumferential welded seam and installed for immediate use. There was about 26 linear feet of welding done and it was completed in about 3 hours. In this plant several smokestacks also have been welded.

History of Rail Steel Is Depicted in Film

A three-reel motion picture film detailing the history of steel reinforcing bars, following the steel from the open hearths to actual use in building construction, has been prepared and is available for rental by the Rail Steel Bar association, 228 North La-Salle street, Chicago. The film is entitled "The Story of Rail Steel," and has been printed on noninflammable safety stock in both 35-millimeter and 16-millimeter widths.

Blistering of Enamel on Iron Explained

Investigation of a problem which has caused much worry to manufacturers of enameled cast-iron ware recently has been completed by the bureau of standards, Washington, after several years' study. It had been known for some time by different manufacturers that certain irons showed a pronounced tendency to the formation of blisters in the enamel. This had come to be associated finally with different kinds of cast iron, for example, Southern cast iron was said to be "nonblistering," whereas Northern cast iron of essentially the same composition was classed as "blistering." The problem has been an obscure one and a great many false leads have been followed.

In the report, which has been submitted for publication, the matter has been largely cleared up. The blistering tendency cannot be ascribed to any particular composition. Blistering is dependent upon the presence of a thin surface film of chilled metal which may exist even in ordinary castings. The carbon in such a "micro" chilled layer is in a condition favorable to the formation of the gas which gives rise to the blisters in the enamel when it is fired. The remedy is simple and efficient, consisting in the removal of the surface of the casting before enameling by sand blasting.

Michigan School Offers Twelve Fellowships

Twelve graduate fellowships of $1200 each are being offered by the Michigan College of Mining and Technology, open to college graduates who have a bachelor of science degree or its equivalent and who are qualified to undertake research in mechanical engineering, metallurgy, chemistry, geology, geophysics, electrical engineering, and ore dressing. The holders of these fellowships will be engaged in the study of various problems in connection of the general research program of the college dealing with iron and copper resources of northern Michigan and their utilization.

Some of the topics to be treated are: application of magnetic and electric principles to the determination of stresses in structures; study of

stresses caused by wind loading; investigation of drill steel for use in mines; research in physical metallurgy; research in rontgenology; pyrometallurgical research; agglomeration; and improvement of methods of exploration, development and extraction of ores. Complete details of the fellowships may be obtained from L. F. Duggan, registrar, Michigan College of Mining and Technology, Houghton, Michigan.

Must Use Ingenuity in Chromium Plating

Research work conducted at the bureau of standards, Washington, supported by the American Electroplaters' society has sought to define those conditions of chromium plating which will give more uniformly distributed deposit in the recesses or on remote parts of irregularly shaped articles.

The plating solution has poor throwing power and the studies thus far show that revolutionary improvements in this direction are improbable. Platers, therefore, must continue to exercise their ingenuity to so arrange the articles in the tank as to get the current density as nearly uniform as possible. The use of relatively dilute solutions of chromic acid, with a low sulphate content and at a fairly high temperature and current density gives better throwing power than the reverse conditions.

Although chromium plating is entirely practicable as shown by its present extensive use, this study shows that it will continue to require more care and ingenuity of the platers to produce complete covering with bright chromium deposits than does plating with nickel or other metals. This subject will be fully discussed in the January issue of *Journal of Research* published by the bureau of standards.

Sees More Wrought Iron Used in Future

Declaring that the next few months will witness a complete rebirth of the ancient wrought iron industry, Dr. James Aston, head of the department of mining and metallurgy, Carnegie Institute of Technology, and consulting metallurgist, A. M. Byers Co., Pittsburgh, in an address Dec. 3 before the American Society of Agricultural Engineers in Chicago, predicted an early realignment of the ferrous metals trades.

Pointing out that wrought iron, which dates back thousands of years before steel was known, was eclipsed only in the last century when the invention of the bessemer process made possible large-scale production of steel, Dr. Aston revealed that the only modern plant in the world for manufacture of wrought iron on a similar scale is nearing completion at Ambridge, Pa. This plant has been achieved only after about 15 years experimental work by the Byers company, owners of the $10,000,000-plant.

Stone Blast Furnace Is Well Preserved

ON THE banks of the Willamette river, 9 miles south of Portland, Oreg., stand the remains of an open-top stone blast furnace, known as the Oswego furnace. The stack, 42 x 9½ feet, was erected and operated in 1866 by the Oswego Iron Co; it was abandoned 13 years later.

About 5000 net tons of iron was smelted annually. A view of the tapping side of the stack is shown in the accompanying illustration. Water power was used to actuate the blowing engines and the blast was heated. Charcoal, which was employed as fuel, was made exclusively from fir obtained from a large forest near the furnace. Ores were mined on the furnace site, and on account of their high graphitic carbon content, the furnace crew frequently experienced difficulty with kish and mushy iron.

Data on Roller Chain

A book on roller chain has been prepared for distribution by the Link-Belt Co., Chicago and Indianapolis. It constitutes a manual for selecting and applying chain to various uses, as data are presented to enable selection of proper chain and wheels for various uses. The book contains 96 pages, presenting illustrations of the construction of chains and wheels and many pages of practical applications of Link-Belt roller chain on light and heavy-duty industrial drives, all types of machinery, tractors, trucks, and farm machinery.

It is designed to aid the engineer and mechanical man and is distributed without cost on request.

Publish Foundry Paper in Preprint Form

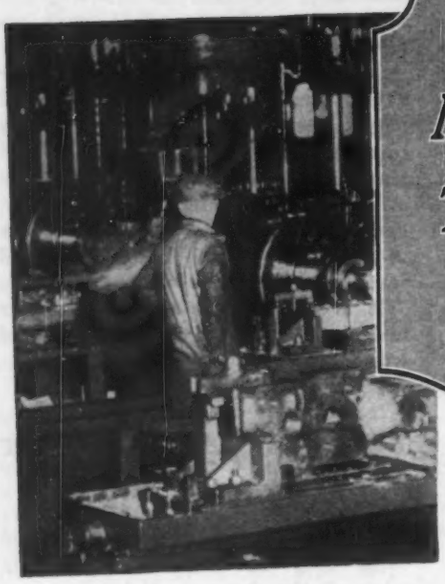
The practice used in baking oil-sand cores may be controlled effectively when all the charges which take place during the baking period are thoroughly understood, according to H. L. Campbell, associate professor of metallurgical engineering, University of Michigan, in his paper on "Baking Practice for Oil-Sand Cores," presented at the annual meeting of the American Foundrymen's association at Chicago last April. Reprints of the paper are being distributed by the department of engineering research, University of Michigan, Ann Arbor, Mich. The price is 25 cents per copy.

Electrochemists Start Memorial Fund

The American Electrochemical society through its board of directors has established the Joseph W. Richards Memorial Lecture fund. Professor Richards, whose name is honored by this new fund, was the first president of the society. He was a member of the faculty of Lehigh university for 35 years where he was head of the department of metallurgy. His death occurred on Oct. 12, 1921.

The fund is to be used to meet the expenses incurred by inviting distinguished foreign scientists to lectures at meetings of the society. The goal set is $30,000, the initial subscription of $1000 being made by Dr. E. G. Acheson, Acheson Graphite Co., Niagara Falls, N. Y. Additional contributions are being sought.

West Michigan Steel Foundry Co., Muskegon, Mich., has changed its capital structure from $124,000 preferred and 77,500 shares no par value convertible preferred to $124,000 preferred, 17,500 shares convertible preferred and 75,000 shares no par common.



New Machine Tools and Shop Equipment

"Without tools man is nothing, with tools he is all."—Carlyle

Compressors Are Duplex Vertical Type

No. 276

Chicago Pneumatic Tool Co., 6 East Forty-fourth street, New York, announces a new vertical duplex single-acting air compressor, built in sizes of from 100 to 310 cubic feet per minute piston displacement and suitable for working pressures up to 150 pounds. The compressor is mounted on a cast-iron sub-base with the electric motor to which it is connected through a flexible coupling. The compressor crankcase is enclosed completely with doors large enough to permit making all adjustments and replacements with ease. The lower part of the crankcase contains two splash troughs into which the connecting rods dip. Main bearing housings are bolted into bored openings in the crankcase. They are fitted with split, die-cast removable babbitt shells assembled with shims between the halves.

Unloading Valves Provided

The cylinder is a duplex one-piece casting completely water jacketed. Cylinder head is cast separately from the cylinder. On the standard compressor the cylinders are equipped with unloading inlet valves which control the quantity of air delivered, by opening the inlet valves of the compressor and allowing the air drawn into the cylinder to return to the atmosphere whenever the receiver pressure reaches the maximum pressure desired. When the demand for air increases, causing a drop in pressure, the unloader allows the inlet valves to close, and the compression is resumed at full capacity.

New Manometer Tube Has Larger Bore

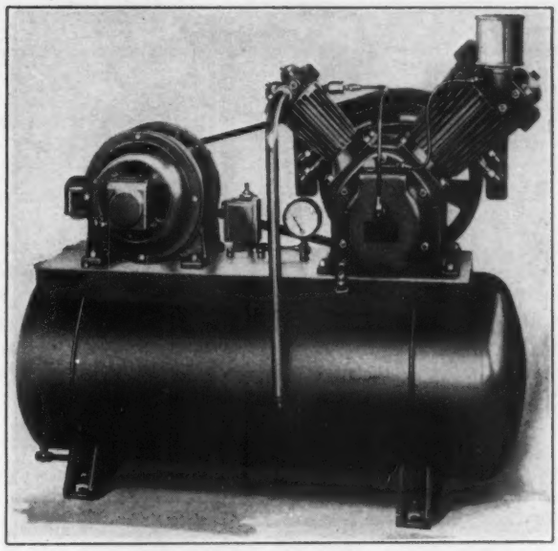
No. 277

Meriam Co., 1955 West 112th street, Cleveland, recently has placed on the market a specially-designed manometer with a larger-bore tube than that generally employed. This

Iron Trade Review's Calendar of New Equipment

Item	Comment	Builder	No.	Date Described	Page
Chain	Roller chain for heavy-duty applications; 2½-inch pitch	Diamond Chain & Mfg. Co.	254	Nov. 28	1382
Meter	Detachable watthour meter in weatherproof case	Westinghouse Electric & Mfg. Co.	255	Nov. 28	1382
Control	Automatic idling device for gasoline driven arc welders	Lincoln Electric Co.	256	Nov. 28	1382
Lathe	Universal turret type; special turret clamp	Gisholt Machine Co.	257	Nov. 28	1383
Grinders	Single-speed and multiple speed heavy-duty units	Hisey-Wolf Machine Co.	258	Nov. 28	1383
Hoist	Steel erectors' hoist; special safety brakes	Lidgerwood Mfg. Co.	259	Nov. 28	1384
Crane	Locomotive crane; 25-ton diesel-powered	Industrial Brownhoist Corp.	260	Dec. 5	1452
Lathe	Adaptation of copying lathe; turns airplane propellers	Defiance Machine Works	261	Dec. 5	1452
Mounting	Method of mounting tungsten carbide metal in tool shank	Advance Diamond Tool Co.	262	Dec. 5	1452
Motor	Single phase, squirrel-cage capacitor type; quiet	General Electric Co.	263	Dec. 5	1452
Wrench	Rotary pneumatic; useful in boiler assembly, etc.	Independent Pneumatic Tool Co.	264	Dec. 5	1453
Hopper	Floor-level type; attached to centerless grinder	Cincinnati Grinders Inc.	265	Dec. 5	1453
Milling machines	Equipped with power quick traverse in six directions	Cincinnati Milling Machine Co.	266	Dec. 5	1453
Grinder	For brake drums; swings work up to 26-inch diameter	Cincinnati Grinders Inc.	267	Dec. 5	1454
Stud setter	Power operated; self-opening with quick release	Titan Tool Co.	268	Dec. 19	1570
Burner	Kerosene; for preheating in welding operations	St. Paul Welding & Mfg. Co.	269	Dec. 19	1571
Shear	Heavy-duty mill squaring shear; several improvements	Niagara Machine & Tool Works	270	Dec. 19	1571
Controller	Triple-drum type for floor operation of cranes	General Electric Co.	271	Dec. 19	1571
Breaker	Meter service breaker; has no fuses	Square D Co.	272	Dec. 19	1571
Hammers	Pneumatic chipping hammers; short overall lengths	Ingersoll-Rand Co.	273	Dec. 19	1572
Bearing	Bi-metal type with seamless steel tube backing	Fredericksen Co.	274	Dec. 19	1572
Contact cable	Pressure on cable at any point closes circuit	Bishop Wire & Cable Corp.	275	Dec. 19	1572
Compressors	Vertical, duplex, single-acting type; electric drive	Chicago Pneumatic Tool Co.	276	Dec. 26	1626
Manometer	Larger-bore tube facilitates reading and filling	Meriam Co.	277	Dec. 26	1626
Facing machine	Faces structural columns; air clamp holds work	Thomas Spacing Machine Co.	278	Dec. 26	1627
Compressors	Two-stage, air-cooled, ball-bearing equipped; electric drive	Ingersoll-Rand Co.	279	Dec. 26	1627
Grinder	Rotary-type; two vertical wheel spindles	G. A. Gray Co.	280	Dec. 26	1628
Screen	Powered vibrator type; single, double or triple deck	Stephens-Adamson Mfg. Co.	281	Dec. 26	1628
Die sets	Complete line of five types and 85 different sizes	Danly Machine Specialties Inc.	282	Dec. 26	1628

facilitates both the introduction of the measuring liquid and the disengagement of air bubbles which would affect the accuracy of the readings. Another advantage claimed for the larger-bore tube is that the greater area largely neutralizes the capillary action of the sides of the tube, thus making the tops of the liquid columns less convex or concave and therefore easier to read correctly. The increased size of bore does not affect in any way the actual differential level between the two legs of the tube since this factor is dependent entirely upon the difference in pressure between the two points to which the instrument is connected.



No. 279—Two-stage air-cooled air compressor, equipped with ball bearings and electric motor with V-belt drive

Column Facing Machine Employs Air Clamp

No. 278

Thomas Spacing Machine Co., Fulton building, Pittsburgh, recently has introduced to the structural trade a new type of column facing machine, an entirely self-contained unit, except for air supply, and occupying little floor space. The machine, shown in the accompanying illustration, has a cutter head of 40-inch diameter and will face up to 24 inches square. A double-headed machine, one head stationary on the foundation and the other movable on rails, may be used to permit facing both ends of a column simultaneously. For rapid setup and for a secure grip of the work an air clamp is used. This clamp exerts a uniform holding pressure on the work and is almost instantaneous in its application. A swinging arrangement of the clamp itself allows the work to be lowered through and the clamp to be swung over it on the bed, thus facilitating material handling on and off the machine.

Oil gear feed is used to actuate the cutting mechanism. This feeding arrangement permits ready control from the greatest feeds on heavy material to the lightest feed where there is any danger of distorting the work. For production work a plate is provided on which may be marked the various control lever positions for different feeds on any material. Another graduated plate is supplied complete with a movable stop which may be set to stop the carriage at any predetermined point with no further attention from the operator. This plate is adjustable to care for the wear in the blades due to grinding.

The cutter head is driven from a helical gear which is cut directly on the cutter head itself. The head is supported by a heavy forged shaft of open-hearth steel mounted in tapered roller bearings. Nine cutting blades are provided which may be removed from the head and a new set inserted quickly. A grinding jig is furnished which allows a complete set of blades to be resharpened in a few minutes.

No. 278—Column facing machine, showing cutter head and air clamp arrangement

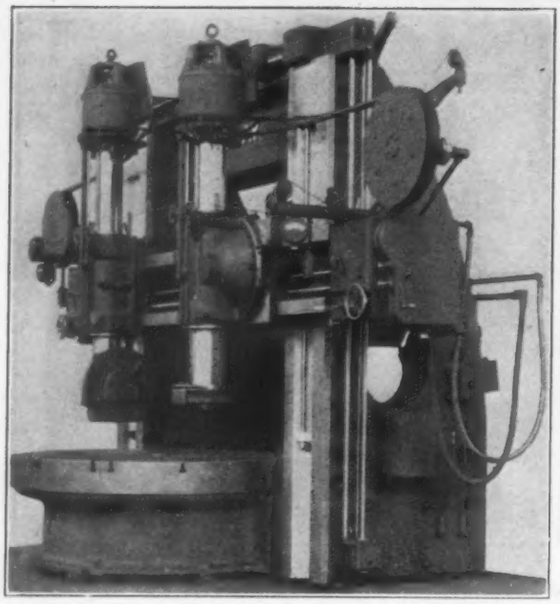
Two-Stage, Ball Bearing Air Compressors

No. 279

Ingersoll-Rand Co., 11 Broadway, New York, announces a new line of air-cooled two-stage air compressors with V-type belt drives and ball bearings incorporated in both motor and compressor. As shown in the accompanying illustration, the units are self-contained, the motor and compressor being mounted on a steel base which is attached to the top of the air receiver. The latter, made of heavy presed steel, is built to withstand a working pressure of 200 pounds. With this arrangement no special foundation is required for correct alignment of the compressor and motor.

Discharge Air Is Cooled

The intercooler is located behind the fan-type flywheel, and a constant current of circulating air is driven directly across the cooling coils, reducing the temperature of the discharge air. Automatic start and stop control, furnished as standard equipment, operates independently but in conjunction with the unloader. When the pressure in the air receiver reaches a point at which the regulator is set to unload, the motor is shut off automatically. A centrifugal governor allows the air in the high-pressure cyl-



No. 280—Two-spindle 108-inch rotary grinder for grinding outside and inside cylinders and cones, and flat surfaces

inder and intercooler to exhaust through the crankcase, thus preventing starting against a load.

Honed cylinders and two oil control rings reduce oil in the discharge air to a minimum. The base of the compressor unit forms a reservoir for the oil and no oil pump is required. A bayonet gage gives positive indication of the amount of oil in the reservoir. A self-cleaning air cleaner keeps dirt out of the compressor which is entirely enclosed. The compressors are built for working pressures up to 200 pounds and in four sizes, ¾, 1½, 3 and 5 horsepower.

Rotary Grinder Equipped with Two Spindles

No. 280

G. A. Gray Co., 3611 Woodburn Ave., Cincinnati, recently has built for the American Manganese Steel Co. a 108-inch rotary grinder for grinding outside and inside cylinders and cones, and flat surfaces. In general appearance the machine resembles a large boring mill, the grinding wheels taking the place of the cutting tools of the boring mill. As shown in the accompanying illustration, the right-hand wheel is set up for grinding an inside cylinder, and the left-hand wheel for grinding a horizontal flat surface. The grinder consists of a heavy boring mill table, bed and driving gearing, to which is attached a pair of housings carrying the grinder mechanism. The work table is driven by a 5-horsepower variable-speed totally-enclosed motor. The two hand levers shown on the right hand housing give four changes of speed while immediately over these levers may be seen a rheostat which controls the speed of the table drive motor. Thus a wide range of table speeds is made available.

Two massive housings are bolted to the bed of the machine. These housings are designed when necessary to carry heavy saddles for additional grinding heads. The housings are joined at the top by a brace carrying the gearing and motor which operate the rail elevating and rapid traverse mechanism. Across the front of the housing extends a rail similar to a boring mill rail, to which are gibbed right and left-hand saddles. On each saddle is mounted a swivel which can, by means of a worm and wheel, be swiveled to any desired angle for the purpose of grinding outside or inside cones.

Spindle Rams Are Rigid

Spindle rams are heavy steel forgings which are ground to a uniform outside diameter. One side of the ram is keywayed to a slight depth to receive the traversing rack which also acts as a key in the swivel to resist the turning moment produced by the grinding wheel pressure. At the upper end of the ram forging is secured a flange to which is bolted the spindle motor. Each spindle has a 25-horsepower 1000-2500 revolutions per minute adjustable-speed motor adjusted for dynamic balance. From the motor flange depends a steel strut carrying at its lower end a counterweight sheave. Two counterweight sheaves are attached to the face of the swivel and under the sheave at the end of the strut, so that the pull of the counterweight counterbalances the weight of the wheel, ram, spindle, motor and other attached parts.

Water for the grinding wheel and electrical current for the wheel motor are supplied by means of a hose and a cable which are wound on a reel supported above the gear case on the end of the rail. The reel winds and unwinds automatically as the ram or saddle traverses, a constant tension being maintained by a weight and cable.

Power Actuated Vibrator Screen Introduced

No. 281

Stephens-Adamson Mfg. Co., Aurora, Ill., has developed a power-actuated vibrator screen, built in varying widths and lengths ranging from 2 feet wide by 4 feet long to 5 feet wide and 8 feet long, all available in the single, double and triple deck assemblies. Four different rotor mechanisms are built for installation in the several assemblies, selected according to the severity of duty. Among the various features of design are: Grid-type screen support; suspended sub-frame; self-aligning ball and roller bearings; pressure lubrication; bronze grease seals; adjustable balancing devices; standard screen panels; quick acting clamps; detachable deck construction; stone box; adjustable angle of incline; V-belt drive; and enclosed fan-cooled driving motors.

Builds Complete Line of Large Die Sets

No. 282

Danly Machine Specialties Inc., 4119 Lincoln avenue, Chicago, has placed on the market a complete line of large die sets, consisting of 4-post and 2-post rectangular die sets, 4-post square die sets, 2 and 3-post long narrow sets, together with heavy-duty guide posts and bushings for these sets. The entire line comprises five different types and 85 different sizes. Both punch and dieholder of each set are equipped with notches so that slings or lifting chains cannot slip. All edges are beveled. One pin in each set is ¼-inch off center to prevent the punch holder from being turned around inadvertently. All sets are equipped with removable guide posts, so that the die may be ground without removal from the dieholder. The long narrow sets are furnished with bosses or pads for stripper bolts. The sets are said to be particularly applicable to such work as automotive parts, farm implements, refrigerator cabinets, hardware, electrical equipment, and for work employing progressive dies where two or more operations are performed at one cycle of the press.

Editorials

Size Means Service, Not Menace

WHEN the current expansion of the Republic Iron & Steel Co. has been consummated and the steelmaking capacity of the new Republic Steel Co. been built up to a total of 4,900,000 gross tons through inclusion of the Central Alloy, Donner, Interstate and Bourne-Fuller properties, the concentration of steelmaking capacity of the country will have been markedly accentuated.

The five largest producers will then account for 43,618,000 tons, or 72 per cent of the country's capacity of 61,000,000 tons of ingots, and the first ten for 51,675,000 tons, or 85 per cent. In midsummer of 1929 the first five producers summed up to 40,348,500 tons or 67 per cent, and the leading ten to 47,998,000 tons or 79 per cent.

To the iron and steel industry this centralization of capacity apparently spells further progress, and to consumers it would seem to foreshadow greater stability and lower costs, considering the merit of the product. At no time in history have the large steel units of the country been in such far-seeing hands. At no time have so many new products been marketed, nor have research or new sales methods been courted so assiduously.

It is reasonable to assume that the promoters of the Republic merger were certain of their legal position before proceeding. There is safety in the fact that the Steel corporation is five times as large, and Bethlehem half as large again. Neither the public nor the lawmaking bodies have sought to stem the tide of consolidation of the past year. Even the Steel corporation, long overcautious on account of the dissolution suit, has purchased a going concern, upsetting a policy of 22 years. Corporate ownership is different today from the antitrust era, and public participation in ownership is a safeguard against attack.

Giving effect to the Pacific coast acquisitions of the United States Steel Corp. and of the Bethlehem Steel Co., the new Republic merger and the capacity being built at Detroit for the National Steel Corp., the capacities of ten leading producers are:

	Steel Ingots	Pig Iron
	In gross tons	
United States Steel Corp.	24,541,000	21,054,145
Bethlehem Steel Co.	8,190,000	6,960,000
Republic Steel Co.	4,900,000	2,900,000
Jones & Laughlin Steel Corp.	3,270,000	2,800,000
Youngstown Sheet & Tube Co.	2,717,000	3,170,000
National Steel Corp.	2,000,000	1,760,000
Inland Steel Co.	1,800,000	950,000
American Rolling Mill Co.	1,557,500	821,400
Wheeling Steel Corp.	1,500,000	1,101,000
Colorado Fuel & Iron Co.	1,200,000	585,000

Wire Use Grows as Nails Decline

ONE of the interesting trends in wire products consumption in western market is the growth in volume of wire rope and strand wire for use in electrical distribution in rural areas. This consumption is keeping pace with the electrification of rural communities in north central and western states. Progress made in the past several years has been of significance, but a surprising percentage of rural homes and communities is without electric light and power.

Another growing use for wire products is in oil drilling. Oil conservation programs affect this market periodically, but the future holds a promising outlook. The fact that western implement and tractor builders are specifying more spring wire for power and other types of equipment is indicative of further possibilities. It is certain that a number of wire consuming groups are supplying much of the deficiency in a dwindling market for wire nail products.

Final Months Pay for Spring Peak

IN A year that has been a notable one in point of business and industrial achievements, the steel industry has recorded some unusual marks both in tonnage output and in departure from former trends of production. An examination of steel ingot output figures for the first 11 months of this year gives the impression that the industry has been forced to crowd a year's work into ten months and that the November and December recession merely has been the result of misplaced seasonality.

The 1929 steel production probably will be about 10 per cent larger than the 49,865,185 tons reported for 1928, and 23 per cent greater than the average yearly output of 44,230,205 tons for the past five years. There was a distinct lack of uniformity in the latter gain over the various months, however. For instance, January showed a 11 per cent increase over the five-year average.

March, which in four of the last five years has been the monthly peak, recorded a 12 per cent gain. May proceeded to upset precedent, however, by being the 1929 high and showed a 40 per cent increase over the five-year average, and the bulge expanded further in June to a 55 per cent increment. Contraction occurred from then on, the spread being 37 per cent in August, 17 per cent in October, while November showed a 5 per cent decrease.

There is little indication that there has been a gradual trend in recent years toward a more pronounced upturn in steel production during spring months. March and April were about 10 per cent ahead of these months in 1928, but the May increase was 25 per cent and the June gain was 35 per cent although last year was the former record in output. Probably in part because of the extraordinary spring bulge, production was moving downward more rapidly than usual at the beginning of the fourth quarter, and regardless of the recent stock market collapse it would have been more unusual for this trend to have been materially altered in November and December than to have continued on the course it took. The stock panic undoubtedly had the effect of accelerating the decline and of lowering the turning point, but its role has been as an accelerating influence rather than the primary one.

Suggest Tool Steel Test Code

AN EXTREMELY large number of tool steel compositions is used in the metalworking industries today and the list is expanding constantly. Just to illustrate, one company is known to be employing over 2000. The wide range of applications of steel for cutting for example, lathe and planer tools, milling machine tools, drills, taps and dies, tools for woodworking and other industries, has made it difficult to formulate uniform specifications. Nevertheless, the demand for some means of standardization has been insistent.

In 1916 the American Society for Testing Materials undertook this task and at present has prepared standard specifications for the three general types of tool steel, namely, carbon, high speed and alloy. The specific composition is left as a matter of agreement between the purchaser and seller, therefore the standard specifications merely establish permissible variations from the composition agreed upon. The Amercian Society for Steel Treating, in its program of developing practices for heat treatment of steels, has included tool steels. Recommended practices have been appended to the carbon and high-speed steel specifications, but on account of the wide range of permissible compositions covered by the alloy tool steel specifications, reference only is made to the recommended heat treatment practices developed from time to time.

Thus it remained only to work out a cutting performance test for tool steels and in 1923 the American Society of Mechanical Engineers began this task. Naturally, the work of this society is related closely to the work of the other two societies. High-speed steel was selected as the subject for the first test code and a tentative code for turning tools was prepared and submitted at the recent annual meeting of the mechanical engineers in New York. The type of code finally adopted will depend upon whether the tests are to be conducted in accordance with laboratory procedure or with the usual facilities available in the machine shop. It is the purpose at this time to obtain constructive criticisms to the end that a satisfactory code may be developed later. When this program is completed the tool steel buyer will have a very definite guide to aid in making purchases.

Structural Work Spread Unevenly

MANY of the smaller fabricating shops have not benefited proportionately in the heavy movement in structural steel shapes which marked the year just closing. This is especially true in the East and New York area. The nature of much of the work has operated against the small shop. There has been a tremendous increase in large projects, jobs calling for 2000 tons and over. Construction activity in smaller buildings, six stories and under, was curtailed except in the industrial field.

This resulted in an uneven spread of structural fabricating work. The larger fabricators have been rushed to capacity. Smaller shops, looking to 500 tons and under per contract, have had a more difficult time. For them the record-breaking tonnage placed in the New York territory especially has not been so impressive. Projects undertaken have worked against the little fellow, and keen competition for the small tonnages in which he is most vitally interested often has pared his profits sharply.

Labor trouble in May, in which attempts were made to organize these New York shops, was a blow from which they suffered during the remainder of the year. Small speculating building dropped sharply. This condition prevailed until late in the last quarter when stock market break released some funds. There are indications, however, of a return of small building which augurs well for the small fabricating shop.

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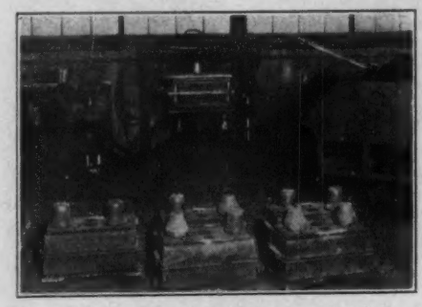

New Foundry Layout Doubles Output of Steel Castings. Page 1615.

Yearbook Has Great Reference Value

THE next issue of IRON TRADE REVIEW, *to be published Jan. 2, will be the annual number, known as the Yearbook of Industry. The yearbook is a comprehensive summary of outstanding developments of the year pertaining to iron and steel, and alloys, and their uses. Its chief value, which makes it a handy reference work for the ensuing year, is its wealth and breadth of statistics. Of the 126 pages of reading matter, more than 30 are devoted exclusively to price and production data, including foreign countries. This is market history, covering a period of many years, arranged for quick reference. Major articles include the ninth annual analysis of American finished steel consumption, mergers consummated during the year, and those giving details of engineering progress.*

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The Business Trend

Order Trend Reflects Soundness

By JOHN W. HILL, Financial Editor

WITH the approach of the new year, business is looking with more than usual interest toward the automobile industry for signs of improvement in that direction. The huge output of cars and trucks during the first nine months of the year was chiefly responsible for record-breaking operations in the iron and steel and various other important lines. The slump in motor car output has had a retarding effect.

BECAUSE of the influence of the automobile industry, its probable trend over the coming months is attracting more than ordinary speculation. The fact that over the last few months of the year operations have been sharply curtailed gives ground for the hope that excess stocks of cars will be less heavy at the beginning of 1930 than they were some time ago. The production of cars and trucks in November in the United States and Canada was approximately 225,000 units, the lowest since December, 1927.

PRESENT indications are that the bottom of the decline will have been seen in December. Orders and specifications for steel point to increased schedules on the part of some companies early in the new year.

DURING the first 11 months of the year production in the United States and Canada was approximately 5,480,000 units. This means that the full year's output will exceed 5,600,000 units. Unquestionably, there will be considerable carryover of cars into 1930. Meanwhile the industry is counting on a replacement demand in 1930 of 3,000,000 cars, with a new demand of approximately 2,000,000 cars, making a total of about 5,000,000.

IF THE automobile industry actually produces 5,000,000 cars and trucks in 1930, it will consume sufficient steel to provide good business for the steel industry. Apparently the railroads will be in the market on a good scale in 1930, as well as they were during the current year.

AS THE year draws to a close, business sentiment is becoming more cheerful, although most business men expect that the first few months will be somewhat slower than the corresponding months of 1929. Nowhere is there any expectation that the coming year will be one of extended and severe depression. Such a view would not be justified by the fundamental factors in control of the economic situation.

The Barometer of Business

INRUSTRIAL INDICATORS

	Nov., 1929	One month ago	One year ago	Average 1913
Pig iron output (Daily average, tons)	106,289	115,747	110,123	83,900
Machine tool orders 3 mos. average	247	287	280	62.8
Unfilled orders (tons)	4,125,345	4,086,562	3,673,000	4,513,000
Ingot output (Daily average, tons)	135,116	167,089	163,882	.....
Dodge Bldg., awards in 37 states (sq. ft.)	51,200,000	65,609,000	73,756,000	.....
Automobile output	225,000	395,000	225,000	.....
Coal output, tons	45,500,000	51,600,000	45,708,000	39,869,000
Business failures; number	1,796	1,822	1,838	1,336
Business failures; liabilities	$52,045,000	$31,313,581	$40,601,000	$22,732,000
Cement production, Bbls.	14,036,000	16,731,000	15,068,000	7,704,000
Cotton consumption bales	540,150	640,000	611,173	438,218
Car loadings (weekly averages)	978,000	1,170,000	1,028,000	.....

FOREIGN TRADE

	Nov., 1929	One month ago	One year ago	Average 1913
Exports	$448,000,000	$530,014,000	$546,000,000	$194,000,000
Imports	$339,000,000	$392,000,000	$327,000,000	$149,900,000
Gold exports	$ 30,289,000	$ 3,805,000	$ 22,915,000	$ 5,234,000
Gold imports	$ 7,123,000	$ 21,321,000	$ 29,591,000	$ 5,900,000

FOREIGN EXCHANGE

	Par	Dec. 21	One month ago	One year ago
Sterling	$4.86	$4.87	$4.87	$4.85 11/16
Francs	19.3c	3.93c	3.93c	3.90 3/16c
Lira	5.26c	5.23c	5.23c	5.23 1/16c
Marks	23.8c	23.93c	23.91c	23.82 1/16c

FINANCIAL INDICATORS

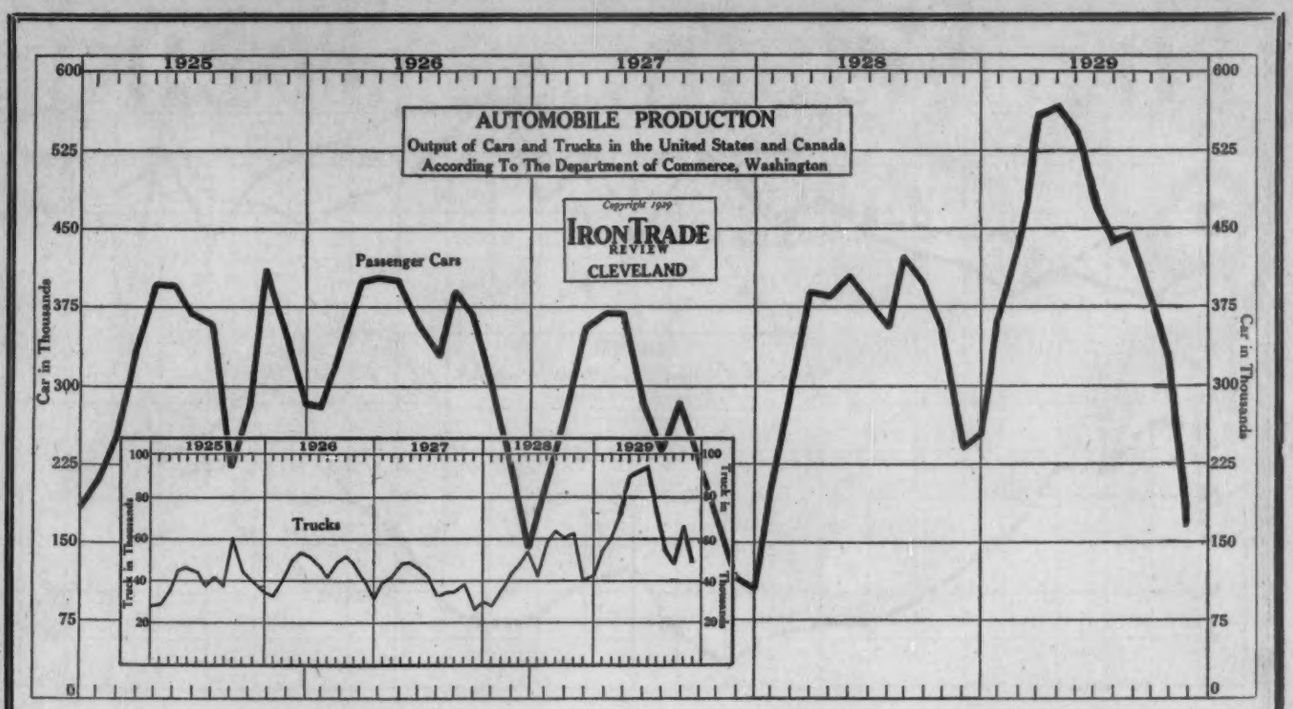
	Nov., 1929	One month ago	One year ago	1913
25 Industrial stocks*	$285.50	$261.88	$301.11	$58.19
25 Rail stocks*	$128.16	$119.52	$125.50	$82.90
40 Bonds*	$86.81	$84.40	$89.98	$93.00
Bank clearings (000 omitted)	$65,484,000	$78,207,086	$56,656,588	$13,895,000
Commercial paper rate N. Y., (per cent)	5	5¾	5½	5.60
Commercial loans (000 omitted)**	$9,557,000	$9,743,000	$9,188,602	.....
Federal Reserve ratio, per cent	71	70	64	.....
Railroad earnings***	$152,987,000	$133,898,000	$166,000,000	$59,301,000
Stock sales, N. Y. stock exchange	72,455,420	141,668,410	115,360,000	6,924,000
Bond sales, par value	$290,680,000	$347,225,000	$219,269,000	$41,499,000

*Dec. 21.
**Leading member banks Federal Reserve System.
***October, 1929.

COMMODITY PRICES

	Dec. 1	One month ago	One year ago	1913
Iron Trade Review composite average of 14 iron and steel prices	$36.05	$36.23	$36.02	$26.32
Bradstreet's index	133	134	140	100
Wheat, cash (bushel)	$1.20	$1.23	$1.07	92c
Corn, cash (bushel)	90c	87c	82c	51c
Petroleum, crude (Bbl.)	$1.30	$1.30	$1.21	$2.50

The Business Trend

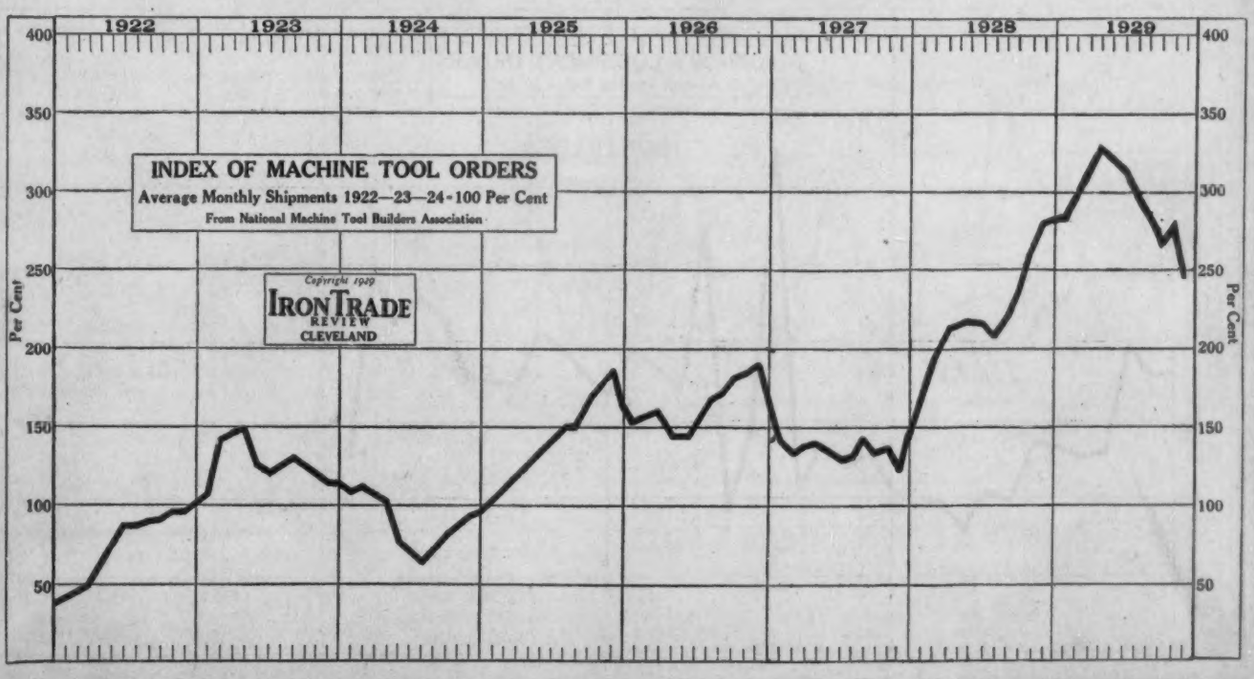


Automobile Production

PRODUCTION of cars and trucks in the United States and Canada in November was the lowest for any month in nearly two years. Total output, with Canadian figures estimated, approximated 225,000 units In the United States alone production was 217,441 units, the smallest total for any month since December, 1927, when 133,370 cars were produced. For 11 months of the year output was about 5,480,000 cars and trucks, indicating that the full year's production would exceed 5,600,000 units.

Machine Tool Orders

ORDERS for machine tools in November dropped sharply from the preceding month. The three months moving average computed by the National Machine Tool Builders association stood at 247 in November, compared with 287 in October. Actual orders for November were 55 per cent of the October level and 62 per cent of the index for November, 1928. The three months moving average is now the lowest since August, 1928. An increased number of cancellations is reported.



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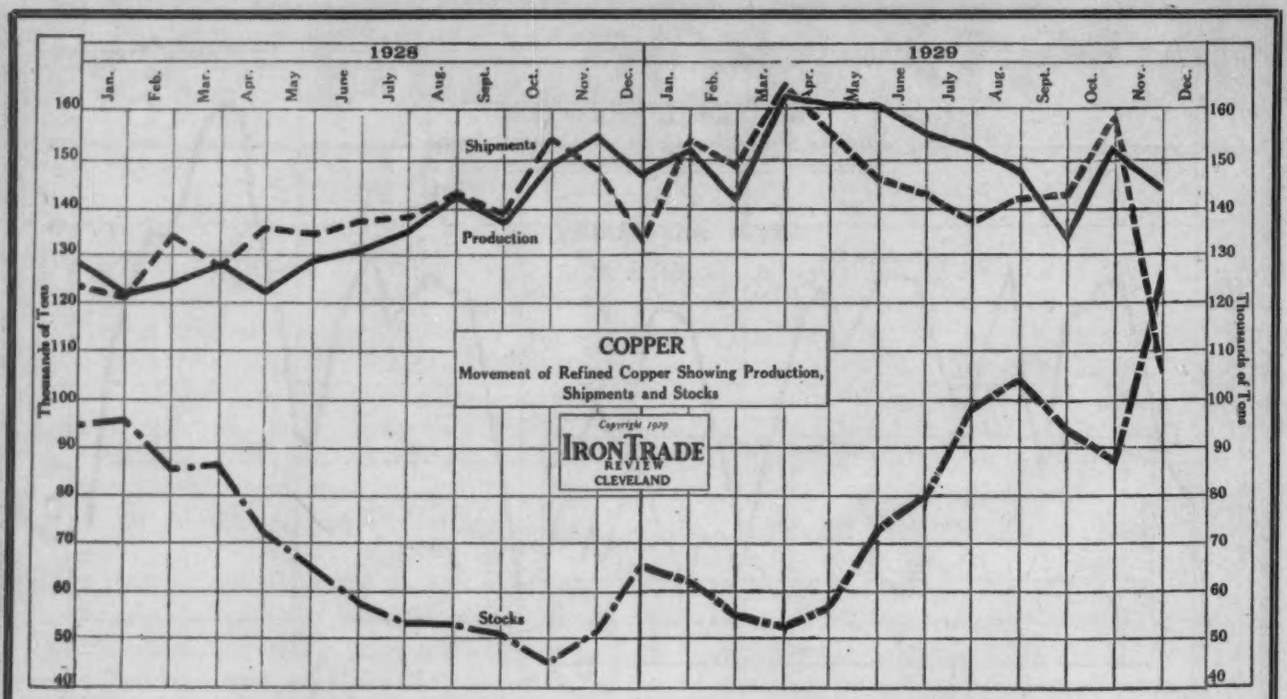
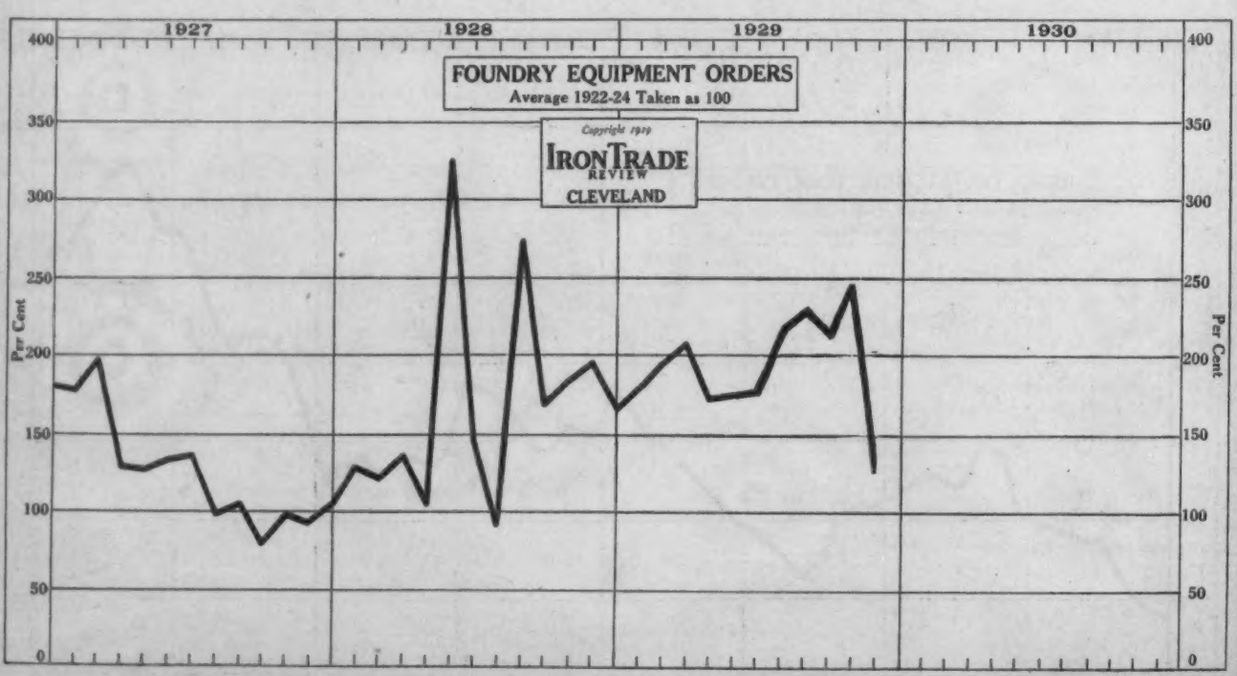


Refined Copper

NOVEMBER brought a sharp increase in the total of stocks of refined copper. At the end of the month the figure stood at 126,919 tons, compared with 88,401 tons in October and 52,153 tons in November, 1928. Shipments declined from 129,190 tons in October to 106,858 tons in November. Production was 145,376 tons, compared with 152,845 tons in October, and 155,448 tons in November, 1928. The increase in stocks was the largest that has been reported in any recent month.

Foundry Equipment

GROSS orders for foundry equipment declined sharply in November. The index compiled by the Foundry Equipment Manufacturers' association stood at 128.6. Average monthly shipments for 1922-1923-1924 are taken as 100. The November index compared with 245.3 in October and with 197 in November, 1928. Shipments dropped off to an index of 152, compared with 214 in the preceding month. Unfilled orders stood at 445, compared with 403 one year ago.



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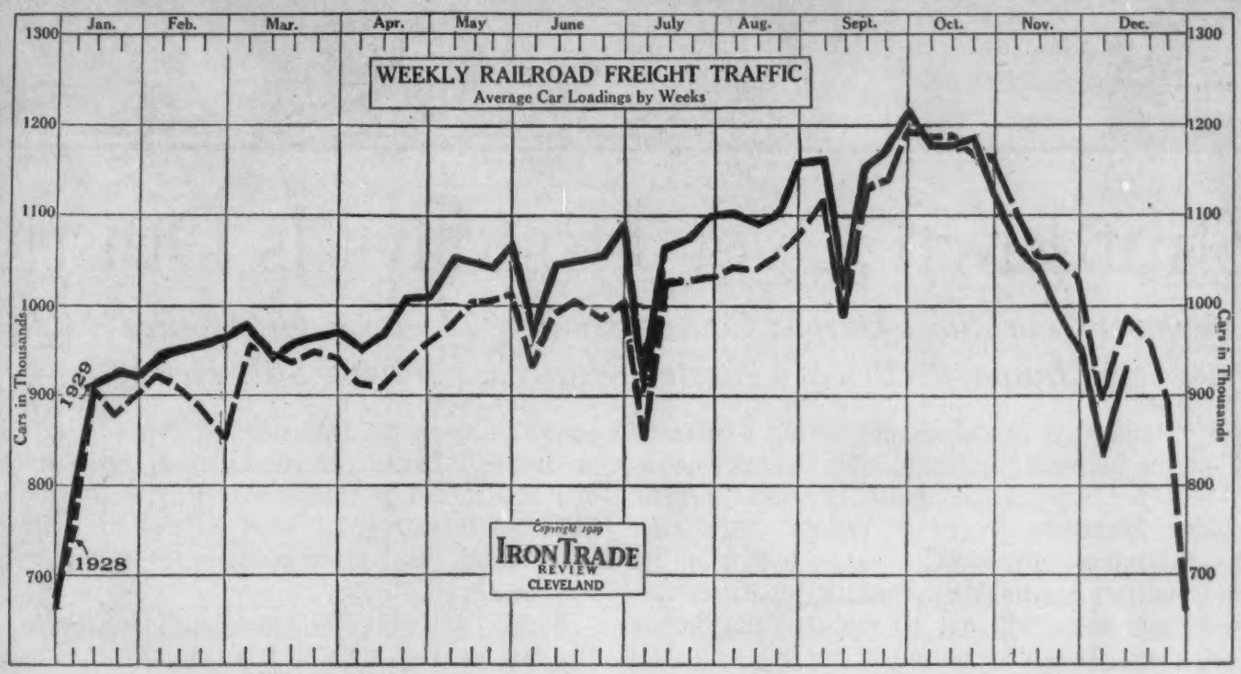
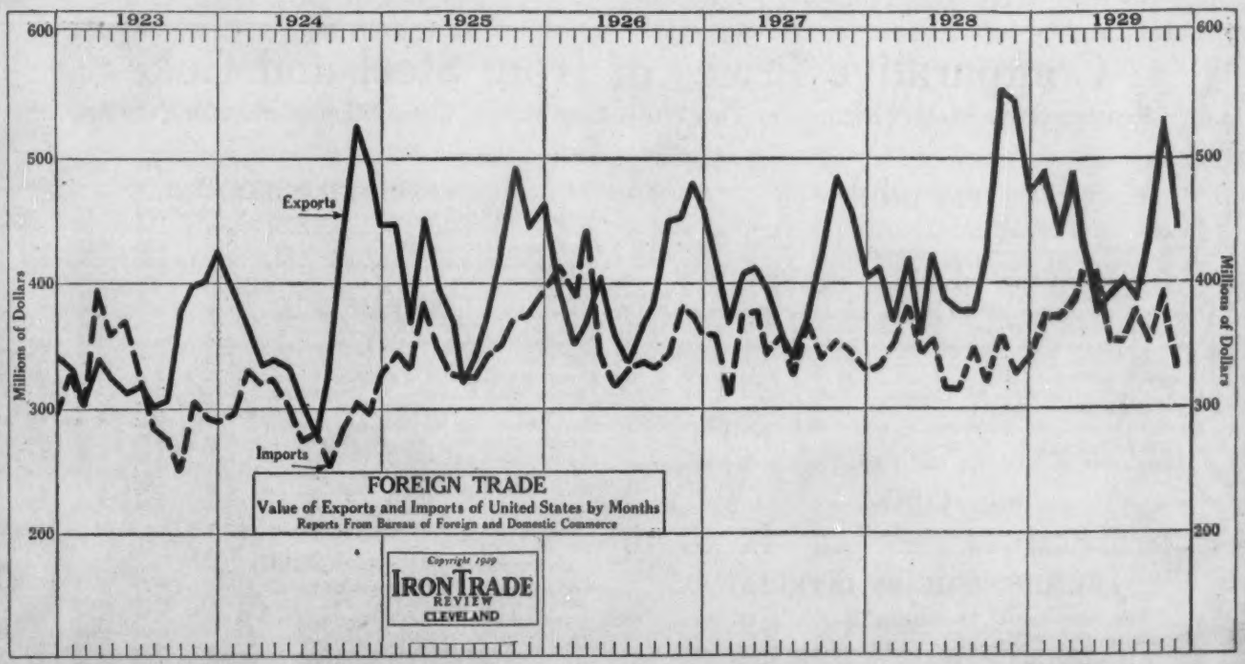


Railroad Traffic

DURING the first week in December freight car traffic showed a marked increase over the preceding week, which included Thanksgiving day, but continued below the level of one year before. Total loadings for the period were 936,825 cars, compared with 837,107 in the preceding week and 984,873 in the corresponding week of 1928. For the year to Dec. 7, freight car loadings were 50,385,621 cars, compared with 49,057,725 in the like period of 1928. This was a gain of over 2 per cent.

Foreign Trade

AMERICAN foreign trade in November showed a recession from the preceding month. Exports were $440,000,000, compared with $528,000,000 in October and $444,000,000 in November, 1928. Imports of $339,000,000 compared with $391,000,000 in October and $326,000,000 in November, 1928. The excess of exports over imports in the first 11 months of the year amounted to $730,404,000, compared with an excess of exports over imports of $900,476,000 in the corresponding period of 1928.



Shutdown Over Holidays Is Drastic

December Iron, Steel Output Lowest Since 1923—Look for Upturn Middle of January—Prices Untested—Railroad Buying Still Heavy

IRON and steel producers are taking advantage of the unusually quiet markets and the necessity for repairs to impose the most drastic holiday shutdown in recent years. Excepting the continuous processes, a large proportion of the country's steelmaking capacity is idle all this week, and some will not be restored until after New Year. December output of pig iron and steel ingots apparently will be the lowest since 1923.

Few Consumers Are Contracting

There has not, however, been a corresponding depression of sentiment. The industry, with the best year in history behind it, is resigned to nominal business until about the middle of January, when it expects demand to come back rather sharply. Consumers now are taking in only their pressing requirements, and are deferring contracting. Unseasonal weather is hindering shipments in the north central states, but causing no distress.

The price situation in both pig iron and finished steel continues to drift, with time apparently more on the side of consumers than producers. Large carryovers from this quarter and the certainty that prices will be no higher leave no incentive for steel buyers to contract. Concessions for prompt-shipment orders seem fewer.

Rarely has pig iron approached so closely to the first quarter with so few commitments made, and a clarification of prices seems probable in some districts. Beehive furnace coke is slightly weaker at $2.60 to $2.65. Iron and steel scrap prices are giving no more ground; in fact, several grades at Pittsburgh are somewhat stronger, and dealers are wary about selling far ahead at current levels.

Over 10,000 Freight Cars Ahead

Six thousand freight cars are actively pending in the East, with a Chesapeake & Ohio inquiry expected. In the West the Chicago, Milwaukee, St. Paul & Pacific has 2300 cars out, while the Illinois Central appears slated to buy 4000 early in 1930. The Texas Co. may act this week on 500

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	Dec. 25, 1929	Nov. 1929	Sept. 1929	Dec. 1928
PIG IRON				
Bessemer, del. Pittsburgh	$20.76	20.76	20.76	20.01
Basic, valley	18.50	18.50	18.50	17.50
Basic, eastern, del. eastern Pa.	19.75	19.75	19.85	19.75
No. 2 foundry, del. Pittsburgh	19.76	19.76	19.76	19.76
No. 2 foundry, Chicago	20.00	20.00	20.00	20.00
*Southern No. 2, Birmingham	14.50	14.00	14.00	16.50
**No. 2X, Virginia furnace	18.25	18.25	20.00	20.50
**No. 2X, Eastern del. Philadelphia	21.76	22.26	22.26	22.01
Malleable, valley	19.00	19.00	19.00	18.00
Malleable, Chicago	20.00	20.00	20.00	20.00
Lake Superior, charcoal, del. Chicago	27.04	27.04	27.04	27.04
†Gray forge, del. Pittsburgh	19.13	19.13	19.13	18.76
Ferromanganese, del. Pittsburgh	104.79	109.79	109.79	109.79

*1.75 to 2.25 silicon. **2.25 to 2.75 silicon.
†Now based on Pitts. dist. fur. price; formerly on Valley base.

COKE				
Connellsville furnace, ovens	2.65	2.65	2.65	2.75
Connellsville foundry, ovens	3.50	3.55	3.75	3.75
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngstown	34.00	35.00	35.00	34.00
Sheet bars, open-hearth, Pittsburgh	34.00	35.00	35.00	34.00
Billets, open-hearth, Pittsburgh	34.00	35.00	35.00	33.00
Wire rods, Pittsburgh	40.00	40.00	42.00	42.00

	Dec. 25, 1929	Nov. 1929	Sept. 1929	Dec. 1928
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.90	1.90	1.95	1.90
Steel bars, Chicago	2.00	2.00	2.05	2.00
Steel bars, Philadelphia	2.22	2.22	2.27	2.27
Iron bars, Chicago	2.00	2.00	2.05	2.00
Shapes, Pittsburgh	1.90	1.90	1.95	1.90
Shapes, Philadelphia	1.91	1.96	2.06	2.06
Shapes, Chicago	2.00	2.00	2.05	2.00
Tank plates, Pittsburgh	1.90	1.90	1.95	1.90
Tank plates, Philadelphia	2.10	2.10	2.15	2.10
Tank plates, Chicago	2.00	2.00	2.05	2.00
Sheets, black, No. 24, Pittsburgh	2.75	2.75	2.85	2.85
*Sheets, blue anl., No. 18, Pittsburgh	2.35	2.35	2.35	2.10
Sheets, gal., No. 24, Pittsburgh	3.40	3.45	3.50	3.60
Sheets, black, No. 24, Chicago	2.90	2.95	3.10	3.00
*Sheets, blue anl., No. 13, Chicago	2.50	2.50	2.50	2.25
Sheets, galvanized, No. 24, Chicago	3.55	3.65	3.75	3.75
Plain wire, Pittsburgh	2.40	2.40	2.45	2.45
Wire nails, Pittsburgh	2.40	2.40	2.50	2.60
Tin plate, per base box, Pittsburgh	5.35	5.35	5.35	5.35

*Comparison for December, 1928, is with old blue annealed base, No. 10.

SCRAP				
Heavy melting steel, Pittsburgh	15.25	16.30	18.45	17.60
Heavy melting steel, eastern Pa.	14.50	15.13	16.38	15.35
Heavy melting steel, Chicago	12.50	13.05	15.05	14.50
No. 1 wrought, eastern Pa.	15.25	16.25	16.13	15.50
No. 1 wrought, Chicago	13.20	13.85	15.70	14.50
Rails for rolling, Chicago	14.50	15.30	17.60	16.50

Current Prices for Rolled Steel Products

STEEL PLATES

Pittsburgh, base	1.90c
Philadelphia, del	2.10c to 2.15c
New York, del.	2.175c to 2.225c
Boston, del.	2.265c to 2.415c
Chicago, base	2.00c
Cleveland, delivered	2.09c
Lackawanna, N. Y., base	2.05c to 2.15c
Birmingham, base	2.05c
Coatesville, Pa., base	2.00c to 2.05c
Pacific Coast, c.i.f.	2.35c
St. Louis, del.	2.22c
Detroit, del.	2.19c

STRUCTURAL SHAPES

Pittsburgh, base	1.90c
Philadelphia, del.	1.91c to 2.01c
New York, del.	2.145c to 2.195c
Boston, del.	2.265c
Chicago, base	2.00c
Cleveland, delivered	2.09c
Lackawanna, N. Y.	2.05c to 2.15c
Birmingham, base	2.05c
Bethlehem, Pa., base	2.00c to 2.10c
Pacific Coast, c.i.f.	2.35c
Detroit, del.	2.19c

BARS

SOFT STEEL

Pittsburgh, base	1.90c
Chicago, base	2.00c
Birmingham, base	2.05c
Lackawanna, N. Y., base	2.00c to 2.05c
Pacific Coast, c.i.f.	2.35c
Cleveland, base, local mills	1.85c
Cleveland, del., outside mills	1.875c
Philadelphia, del.	2.22c
New York, delivered	2.24c to 2.29c
Boston, delivered	2.265c
Detroit, del.	2.07c to 2.19c
Pittsburgh, cold finishing	2.00c
Pittsburgh, forging quality	2.15c

RAIL STEEL

Chicago Heights	1.90c to 1.95c
Eastern mills	1.85c to 1.95c

IRON

Chicago, base	2.00c to 2.10c
New York, delivered	2.19c to 2.24c
Philadelphia, delivered	2.17c to 2.22c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pittsburgh, billet, cut lengths	2.20c
Stock lengths from mill	1.95c
Chicago, billet	2.00c to 2.10c
Chicago, rail steel	1.85c to 2.00c
Chicago, rail steel, road and bridge work	1.95c to 2.05c
Philadelphia, cut lengths	2.42c to 2.62c

CORROSION, HEAT RESISTANT ALLOYS

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel

Sheets....35.00c; plates....31.00c; bars....28.00c

	A	B	C	D
Bars	19c	20.5c	22c	25c
Plates	22c	23.5c	25c	28c
Sheets	26c	27.5c	29c	32c
Hot strip	19c	20.5c	22c	25c
Cold strip	28c	29.5c	31c	34c

All have carbon 0.12% and under. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30% inc.

SHEETS

SHEET MILL BLACK, No. 24

Pittsburgh, base	2.75c
Philadelphia, delivered	2.97c to 3.07c
Gary, Indiana Harbor	2.85c
Chicago, delivered	2.90c
Birmingham base	3.00c
St. Louis, del.	3.07c

TIN MILL BLACK, No. 28

Pittsburgh, base	2.90c to 3.00c
Gary, base	3.00c to 3.10c

GALVANIZED, NO. 24

Pittsburgh, base	3.40c to 3.50c
Philadelphia, delivered	3.62c to 3.72c
Gary, Indiana Harbor	3.50c to 3.60c
Chicago delivered	3.55c to 3.65c
Birmingham, base	3.65c
St. Louis, del.	3.82c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.35c
Chicago, district mills	2.45c
Chicago, delivered	2.50c
St. Louis, delivered	2.67c
Philadelphia, delivered	2.67c
Birmingham	2.50c

BLUE ANNEALED PLATES, NO. 9-10

Pittsburgh, base	2.20c
Chicago district mills	2.30c
Chicago, delivered	2.35c
Philadelphia, delivered	2.52c
St. Louis, delivered	2.52c
Birmingham	2.35c

AUTOMOBILE, NO. 20

Pittsburgh, base	4.00c
Detroit, delivered	4.29c

FURNITURE

Pittsburgh	4.00c to 4.10c

(Turn to the following page)

tank cars. The Birmingham Southern has placed 25 box cars. The Canadian National has ordered 40 locomotives and the Missouri Pacific five.

Chicago rail mills expect to book 100,000 tons in the next month. Atlantic Coast Line has placed 7000 tons additional. New York Central is distributing its 14,000 tons of track accessories, half having been allotted to Chicago district makers.

Gas and oil pipe line projects in the Middle West are regarded by Chicago district mills as even more promising for 1930 than they were for 1929. Specifications for welded pipe material enable Chicago plate mills to hold to 75 per cent operations, considerably higher than Pittsburgh and Youngstown mills. In the East inquiry for cast iron pipe for municipal purposes for first-half laying is broadening, totaling 20,000 tons.

Shape Awards Exceed 56,000 Tons

Twelve river barges, requiring 1850 tons of plates and shapes, have been bought at Pittsburgh. Two Great Lakes barges, involving 2000 to 2500 tons of plates, are being figured. Structural steel awards, totaling 56,000 tons this week, were topped by 6800 tons for New York subway work. At Chicago public utilities account for 4000 tons of awards and a like total of inquiry. Automotive specifications for steel have subsided from the slight bulge of the past fortnight. Makers have about completed their initial trial runs on January show models and are now awaiting the verdict. Strip, sheet and bar mills at Youngstown, Pittsburgh and Cleveland especially are sensitive to this trend. Tin plate specifications equal December average.

In the Great Lakes region a slight increase over the November rate of merchant pig iron shipment is reported. Chicago forecasts a heavier demand for malleable iron in the first quarter. Alabama iron is offered at $13.50, Birmingham, in some northern markets despite a 50-cent advance in home territory.

Steel Operations Decline Sharply

Independent steelmakers in the Youngstown district are operating this week at 30 per cent, and Steel corporation plants at 50. Ingot operations at Chicago have declined to 55 per cent although 22 of 36 steelworks blast furnace stacks continue active. At Pittsburgh the steel rate is no higher than 60 per cent, and at Buffalo about 40.

Rising cost of production has prompted the British Steel association to advance plates 61 cents a ton and structural shapes $1.21 to $1.82. Most British steelworks are closed this week. Belgian mills will establish minimum prices on bars, plates, shapes and semifinished steel. Some German plants are reported to be stocking steel.

Composite Market Average

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Structural Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe

This week (December 25, 1929)	$35.89
Last week (December 18, 1929)	35.97
One month ago (November, 1929)	36.03
Three months ago (September, 1929)	36.50
One year ago (December, 1928)	36.22
Ten years ago (December, 1919)	54.88
Fifteen years ago December, 1914)	21.58

Following a rise last week when southern pig iron was advanced, the IRON TRADE REVIEW composite of 14 leading iron and steel products has declined 8 cents this week, to $35.89, the lowest point in 13 months.

Current Rolled Steel Prices

PRICES IN CENTS PER POUND UNLESS OTHERWISE INDICATED

Tubular Products Quoted On Last Editorial Page—See Preceding Page For Other Products

HOOPS, BANDS, STRIPS

Hot strip, to 6-in., Pitts.	2.00c
Hot strip 6 1/16 to 24-in., Pitts	1.90c
Hot strip, bands 6 in. and under, Chicago	2.10c
Do, 6 1/16 to 23 1/2	2.00c
Cooperage stock, Pittsburgh	2.20c
Do, Chicago	2.30c
Cold rolled strip, hard coils, 16 inches and under by 0.100-inch and heavier, base Pitts., Cleve, (3 ton and over)	2.75c
Worcester, Mass. (3 tons and over)	2.90c to 3.00c

ALLOY STEEL

Hot Rolled
F.o.b. Mills
Alloy Quality Bar Base is 2.65c

S.A.E. Series Number	Alloy differential	Net 100 lb.bars
2000	0.25	$2.90
2100	0.55	3.20
2300	1.50	4.15
2500	2.25	4.90
3100	0.55	3.20
3200	1.35	4.00
3300	2.80	6.45
3400	3.20	5.85
4100 0.15-0.25 Mo.	0.50	3.15
4100 0.25-0.40 Mo.	0.70	3.35
4600 0.20-0.30 Mo. 1.25-1.75 Ni.	1.05	3.70
5100 0.60-0.90 Cr.	0.35	3.00
5100 0.80-1.10 Cr.	0.45	3.10
5100 Chrome Spring	0.20	2.85
6100 Bars	1.20	3.85
6100 Spring Steel	0.95	3.60
Chrome Nickel Vanadium	1.50	4.15
Carbon Vanadium	0.95	3.60
9250 (flats)	0.25	2.90
9250 (rounds, squares)	0.50	3.15

Hot rolled alloy billets 4 x 4-inch and over take same price per gross ton as same specification alloys bars per net ton. Sizes under 4 x 4 to 2½ in. x 2½ in. inclusive sold on bar basis plus steel bar card extras for size. Sizes under 2½ in. x 2½ in. take bar price on net ton basis.

COLD FINISHED STEEL

Bars, drawn or rolled, Pitts., Chi., Buffalo, and Cleve. c.l.	2.20c
Do, delivered, Detroit	2.435c
Shafting (turned, polished) Pittsburgh, Buffalo	2.20c
Shafting (turned, ground) mill (Depending on size, 1 3/16 to 7-inch)	2.55c to 3.00c

WIRE PRODUCTS

F.o.b. Pittsburgh, Cleveland, Ironton base
(Per 100 pound keg)

	Trade	Jobbers
Standard wire nails	$2.50	$2.40
Cement coated nails	2.50	2.40
Galvanized nails	4.50	4.40
(Per pound)		
Polished staples	2.95c	2.85c
Galvanized staples	3.20c	3.10c
Barbed wire, galvanized	3.15c	3.05c
Annealed fence wire	2.65c	2.55c
Galvanized wire	3.10c	3.00c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

Anderson, Ind., $1 higher. Chicago $2 higher, Duluth, Birmingham $3 higher.

Bright plain wire, 6 to 9 gage	2.40c
Wire, delivered Detroit	2.57c
Nails, delivered Detroit	$2.58 to 2.72

Joliet, DeKalb and Waukegan, Ill., Anderson, Ind., and Chicago prices $1 per ton over Pittsburgh-Cleveland-Ironton base on products made there; Duluth $2 higher; Worcester, Mass., Fairfield, Ala., $3 higher.

CUT NAILS, CHAIN, PILING

Cut nails, c.l., f.o.b. mills	2.70c
Cut nails, l.c.l. f.o.b. mills	2.80c
Sheet piling, base, Pittsburgh	2.20c

Chain proof BB and BBB, Pitts.

3/16-in. to ⅜-in.	33 1/3 and 5 off
9/16-in. to 1½-in.	33 1/3 off

CAST IRON WATER PIPE

Class B Pipe—Per Net Ton

Six-inch and over, Birming'm	$37.00 to 38.00
Four-inch, Birmingham	41.00 to 42.00
Four-inch, Chicago	48.20 to 49.20
Six-inch to 24-inch, Chicago	44.20 to 45.20
Six-inch and over, New York	36.50 to 38.50
Four-inch, New York	40.00 to 41.00
Standard fittings, Bir. base	$100.00

Six to 24-inch, base; over 24-inch, plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

Class A pipe is $4 higher than Class B.

TIN PLATE; TERNE PLATE

Prices per 100-pound box Pittsburgh

*Tin plate, coke base	$5.35

Gary, Ind., base 10 cents higher.

Long ternes, primes, No. 24— 4.00c to 4.10c

*Price subject to quantity differentials.

WASHERS

Wrought, c.l., Pitts. dist.	$6.50 to 6.75 off
Wrought, c.l., Chicago dist.	$6.702 to 26.90 off
Lock: to dealers	85-5 off
Lock: to consumers	85 off

RAILS, TRACK MATERIAL

Standard bessemer rails, mill	$43.00
Standard open-h'th rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 29.00
Light rails, 25 to 45, mills	$36.00
Angle bars, Chicago base	2.75c
Spikes, railroad, Pittsburgh	2.80c
Spikes, small railroad, 7/16-inch and smaller, Pitts.	2.80c
Spikes, boat and barge, Pitts.	3.00c
Spikes, railroad, Chicago	2.80c
Track bolts, Pitts., steam roads	3.80c
Track bolts, Pitts., stand. jobbers	70 off list
Track bolts, Chicago	3.80c
Tie plates, Chicago, Pitts.	$43.00

BOLTS AND NUTS

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts are for legitimate jobbing or large consuming trade purchasing in full-case lots, apply to lists of April 1, 1927.

Small lots are 55 to 60 per cent off.

CARRIAGE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Eagle list	60 to 70 off

MACHINE BOLTS

All sizes, cut thread	60 to 70 off

Rolled thread ⅝ x 6 and smaller take 10 per cent lower list.

Lag screws	60 to 70 off
Plow bolts, Nos. 1-2-3-7 heads	60 to 70 off
Tap bolts	60 to 70 off
Blank bolts	60 to 70 off
Stud bolts without nuts	60 to 70 off
Stove bolts, 75, 20 10 and 5 off in pkgs., 75, 10, 10 and 5 with 2½ off in bulk.	
Tire bolts	60-5 off

Nuts

Semifinished	60 to 70 off

HEXAGON CAP SCREWS

Milled	80-10-5 off
Upset 1 in. diam. and smaller	5 off

SQUARE HEAD SET SCREWS

Milled	80-5 off
Upset 1 in. diam. and smaller	80-10-5 off

RIVETS

Struc., c.l., Pitts.-Cleve.	3.10c
Structural, c.l. Chicago	3.20c
**7/16-inch and smaller, Pitts.	70 and 10 off
Chi., Cleve.	70 to 70 and 10 off

**Some makers quoting 70 off with freight allowed on 300 pounds or more.

Raw Materials and Semifinished Products

SEMIFINISHED STEEL

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pittsburgh, open-hearth	$34.00 to 35.00
Pittsburgh, bessemer	34.00 to 35.00
Youngstown	34.00
Cleveland	34.00
Philadelphia	40.30
Chicago	36.00
Forging, Chicago	41.00
Forging, Pittsburgh	39.00 to 40.00
Forging, Philadelphia	45.30

SHEET BARS

Pittsburgh	$34.00 to 35.00
Youngstown	34.00
Cleveland	34.00
Chicago	36.00

SLABS

Pitts., Young.	$34.00 to 35.00
Cleveland	34.00

WIRE RODS

Pittsburgh, Cleveland	$40.00
Chicago	41.00
Youngstown	40.00 to 42.00

SKELP

All grades, Pittsburgh	1.85c to 1.90c

IRON ORE

LAKE SUPERIOR ORE
Per Gross Ton, Lower Lake Ports

Old range bessemer, 51½%	$4.80
Mesabi bessemer, 51½%	4.65
Old range nonbessemer, 51½%	4.65
Mesabi nonbessemer, 51½%	4.50
High phosphorus, 51½%	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%	9.00 to 10.00
Copper-free low phos. 58-65%	nominal

FOREIGN ORE

Cents per units, alongside docks

Atlantic ports

Foreign manganiferous ore, 45-55% iron, 10-12% manganese	12.00 to 12.50
North African low phosphorus	12.50
Swedish basic, 65%	10.50
Swedish low phosphorus	12.00
Spanish and North African basic, 50 to 6% (nominal)	11.50 to 12.00
Newfoundland foundry, 55%	nominal
Tungsten future, short ton unit, duty paid	15.25 to 15.50
Chrome ore, 48-50%, long ton c.i.f.	$22.00 to 24.00

MANGANESE ORE

Prices, not including duty, are cents per unit; cargo lots.

Caucasian (52-55 per cent)	30 to 32 cents
Indian (48-50 per cent)	30 to 32 cents
Brazilian (46-48 per cent)	29 to 31 cents

FLUORSPAR

85 and 5 per cent grade

Washed gravel, Kentucky and Illinois mines, per net ton	$18.00
Washed gravel, import duty paid east, tide., gross ton	$21.00

REFRACTORIES

FIRE CLAY BRICK
Per 1000 f.o.b. works

First Quality

Pennsylvania	$43.00 to 46.00
Ohio	43.00 to 46.00
Illinois	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Maryland	43.00 to 46.00
Georgia and Alabama	40.00 to 45.00

Second Quality

Pennsylvania	35.00 to 38.00
Ohio	35.00 to 38.00
Illinois	35.00 to 38.00
Kentucky	35.00 to 38.00
Missouri	35.00 to 38.00
Maryland	35.00 to 38.00
Georgia and Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	43.00
Joliet, Ill., East Chicago, Ind.	52.00
Birmingham	50.00 to 51.00

MAGNESITE BRICK
Per Net Ton

9 x 4½ x 2½	65.00

MAGNESITE

Net Ton Chester, Pa., and Baltimore base

Dead-burned grain magnesite	40.00
Domes., Chewelah, Wash., base	$22.00

CHROME BRICK

Net Ton Chester, Pa., and Baltimore base

9 x 4½ x 2½	45.00

Pig Iron

Shipments Steady — Prices Unchanged— Melters Issue Inquiries, but Are Slow to Contract for First Quarter

DEMAND for pig iron in the Great Lakes districts shows considerable vitality, despite the quiet tone of the markets. Shipments in the Chicago territory in December show a slight gain over those in November, and some Lake Erie furnaces report their shipments have increased during the latter part of December. An important merchant furnace interest estimates about 5 per cent of its customers' first quarter requirements are under contract. A larger demand for malleable for first quarter is indicated by estimates at Chicago. Sales of all grades at Cleveland increased to 13,900 tons for the week. General Electric Co. is inquiring for 4000 tons for six plants. Alabama iron continues to sell at previous levels in northern districts, despite the announced advance of 50 cents.

PITTSBURGH, Dec. 24.—Consumer interest in pig iron is at a low ebb, buying being deferred until after the holidays. Current production is the smallest of the year. Old orders are gradually being completed, lack of new buying being reflected in the declining stocks at consumer's yards. This situation is expected to promote heavier purchases after the first of the year. No additional inquiries are before producers, and spot orders are limited to occasional small tonnages. On this business prices continue firm at $18.50, base, valley, for basic and No. 2 foundry, and $19 for bessemer and malleable.

New York, Dec. 24.—Pig iron demand is more active. Sales the past week totaled more than 8000 tons, and new inquiry about 10,000 tons. General Electric Co. wants 4000 tons of foundry iron for first quarter delivery to its plants at Erie, Pa., Elmira, N. Y., Bayway, N. J., Schenectady, N. Y., Pittsfield, Mass., and tady, N. Y., Jittsfield, Mass., and Lynn, Mass. A Bridgeport, Conn., buyer is inquiring for 1500 tons for first quarter. Worthington Pump & Machinery Corp. is in the market for 450 tons for Cincinnati. Buffalo foundry iron is $17 to $17.50, base, furnace, and southern iron $19 to $19.50, New York docks.

Boston, Dec. 24.—Pig iron sales are in small volume. A report is current that a Worcester foundry bought 800 tons of malleable at $16.75, Buffalo furnace. Two inquiries are noted, one for 2150 tons and another for 500 tons.

Philadelphia, Dec. 24.—Several thousand tons of foundry iron was placed on makers' books during the week for first quarter, and considerable inquiry is in prospect, but indications are the real buying movement will not get under way until after Jan. 1. Eastern Pennsylvania foundry iron continues $20.50 to $21, base, furnace, but $20.50 is the most frequently quoted. Two to three thousand tons of low phosphorus iron was sold at $24, eastern Pennsylvania furnace, for copper free, and $23.25 to $23.50 for copper bearing. Several small lots of southern foundry iron were sold in this district in the past week at $13.50 to $14.50, base, Birmingham.

Buffalo, Dec. 24.—Some fair size pig iron orders are being placed for first quarter shipment. Producers here say No. 2X iron for eastern delivery has generally brought $18, Buffalo, although $17.50 or less may have been done on some of the larger tonnages. Inquiry totals about 5000 tons.

Pig Iron Prices

Per Gross Ton

Bessemer, valley furnace	$19.00
Bessemer, del. Pittsburgh	20.76
Basic, valley furnace	18.50
Basic, Pitts., dist. fur.	19.00
*Basic, del., Pitts	19.63 to 20.13
Basic del., eastern Pa	19.75 to 20.25
Basic, Buffalo furnace	18.50
Malleable, valley furnace	19.00
Malleable, Pitts., dist. fur.	19.50
*Malleable, del. Pittsburgh	20.13 to 20.63
Malleable, Cleve. fur. for local del.	19.00
Malleable, Chicago furnace	20.00
Malleable, Buffalo furnace	20.00
Malleable, del. eastern Pa.	21.26 to 22.76
Malleable, Granite City fur.	20.00
No. 1 foundry, Chicago furnace	20.50
No. 1X, Eastern del., Phila	22.26 to 22.76
No. 1X, Buffalo furnace	21.00
No. 2 foundry valley furnace	18.50
No. 2 fdy., Pitts. dist. fur	19.00
*No. 2 foundry, del. Pittsburgh	19.63 to 20.13
No. 2 plain, Buffalo furnace	19.50
No. 2 foundry, Chicago furnace	20.00
No. 2 fdy., Cleve. fur. for local del.	19.00
No. 2 fdy., Granite City	20.00
No. 2 plain, del., Phila	21.76
No. 2 plain, Virginia furnace	17.75
No. 2 plain, Buffalo, del. Boston	21.91 to 22.41
No. 2 plain, N. J., tidewater	21.26 to 21.76
No. 2 Alabama, Bir. base	14.50 to 15.00
No. 2 Tenn., Birmingham base	14.50 to 15.00
No. 2 Tenn., del. Cincinnati	17.69 to 18.19
No. 2 Alabama, del. Cincinnati	17.69 to 18.19
No. 2 Alabama, del., Cleveland	20.51 to 21.01
No. 2 Alabama, del., Chicago	19.51
No. 2 Alamaba, del., St. Louis	19.42
No. 2 Ala., Phila., dock dely.	19.25 to 19.75
No. 2 Ala., Balt., dock dely.	19.00 to 19.50
No. 2 Ala., N. Y., dock dely.	19.00 to 19.50
No. 2 Ala., Boston, dock dely.	20.21
No. 2X, east, N. J., tidewater	21.28 to 21.78
No. 2X, eastern, del. Phila.	21.76 to 22.26
No. 2X, foundry, Buffalo furnace	20.00
No. 2X, Buffalo, del. Boston	21.91 to 22.91
No. 2X, Virginia furnace	18.25
Gray forge, Pitts. dist. fur.	18.50
*Gray forge, del. Pittsburgh	19.13 to 19.63
Low phos., standard, valley	27.00
Low phos., standard, Phila.	24.76
Low phos., copper bearing fur.	23.00 to 24.00
Charcoal, Superior, del., Chicago	27.04

*Freight from Pittsburgh district furnace to points in Pittsburgh district 63.00c, 76.00c and $1.13 per ton.

CANADIAN PRICES

No. 1 foundry, del. Toronto	$23.60
No. 1 foundry, del. Montreal	25.60
No. 2 foundry, del. Toronto	23.10
No. 2 foundry, del. Montreal	24.50
Malleable, del. Toronto	23.60
Malleable, del. Montreal	25.00
Basic, del. Montreal	23.50

Silvery iron Jackson county, O., furnaces in per cents: 5—$22; 6—$23; 7—$24; 8—$25; 9—$26; 10—$28; 11—$30; 12—$32; 13—$34.

Bessemer ferrosilicon, Jackson county, O., furnaces, in per cents: 10—$30; 11—$32; 12—$34; 13—$36; 14—$38; 15—$41; 16—$43.50; 17—$46.50.

Cleveland, Dec. 24.—Melters have made inquiries for pig iron prices for first quarter, but do not show much speed in closing. A merchant furnace interest estimates that not more than 5 per cent of its customers' requirements for the next three months have been covered. Current orders are in fair volume, but are mainly for early shipment. The total booked by Cleveland furnace interests during the week was 13,900 tons, compared with 9300 tons in the week preceding, and 16,000 tons in the week before that. Shipments now are better than they were in the first half of the month, some producers report. Westinghouse Electric & Mfg. Co. has not yet closed on its recent inquiry for requirements at its Cleveland plant. Prices are unchanged.

Cincinnati, Dec. 24.—Announcement that some southern furnaces are quoting $15, base, Birmingham, has failed to change the pig iron market north of the Ohio river in this district. Although a 50-cent increase may go in effect later, southern iron still is quoted $14.50, and this price has not had a tonnage test. Sales the past week reached 3500 tons, of which 800 tons was special iron for Michigan consumers. A Connersville, Ind., melter contracted for 400 tons.

Chicago, Dec. 24.—Shipments of northern pig iron show a slight gain over November. While competitive prices are being met in northern and central Indiana and western Michigan, the market is considered stabilized on the basis of $20, Chicago furnace.

Several small lots of southern iron were sold here in the past week on the basis of the prevailing outside price of $13.50, base, Birmingham. It is stated some offers were made under that price. Sellers of northern malleable iron report estimated requirements of contract buyers now being received for first quarter indicate some gains over the present quarter.

St. Louis, Dec. 24.—Sentiment among producers and distributors of pig iron has taken a decidedly optimistic turn. Small prompt tonnages are being sold, and a good volume of inquiry is being received for first quarter. December business has attained the seasonal

(*Concluded on Page* 1642)

Coke

Beehive Furnace Fuel Easier—Stocks Continue to Increase—Few Contracts for First Quarter

PRODUCERS' stocks of beehive furnace coke continue to mount, although production has been further reduced to a new low point for the year. Spot tonnages are easier, $2.60 now being the generally quoted level. Consumers show little interest in contracting for furnace or foundry coke for the first quarter. Cold weather has stimulated demand for domestic coke in some districts.

Pittsburgh, Dec. 24.—Activity in the beehive coke market is light, with demand for heating fuel making the best relative showing. Demand for furnace coke is dull, both as regards spot and contract tonnages. Spot prices are slightly easier, with $2.60 more generally quoted by sellers. Higher figures are named on tonnage for extended shipment. Orders for heating coke are not brisk, but prices have a stronger tone. Stocks of furnace coke continue to increase despite further reduction in production to the year's lowest level.

Production of coke in the Connellsville region for the week ended Dec. 14 was 39,400 tons, according to the *Connellsville Courier*. This compares with 42,120 tons last week and 60,000 tons for the same period a year ago.

New York, Dec. 24.—While contract specifications are coming out fairly well, spot demand for coke is sluggish. By-product foundry coke holds at $9 to $9.40, delivered, Newark, N. J.; $11, delivered, New England, and $9, delivered, Philadelphia. Beehive foundry coke is $3.50 to $4.85, Connellsville, and beehive furnace coke $2.75 to $3, Connellsville, subject to occasional shading of about 10 cents.

Buffalo, Dec. 24.—Demand for domestic coke is exceptionally good. Prices show the steady influence of large buying. Demand for foundry and furnace grade is unchanged.

Cincinnati, Dec. 24.—Foundry demand for by-product coke continues below the November rate. A cold wave has caused a call for domestic grades. Prices are steady.

Chicago, Dec. 24.—A number of first half by-product foundry coke contracts have been placed at $8, ovens, or $8.75, delivered in the Chicago switching district. Oven capacity is almost fully engaged.

St. Louis, Dec. 24.—Shipments of metallurgical coke have decreased slightly, due to reduced requirements and a desire to hold down inventories. Shipments of domestic coke are in

Birmingham, Ala., Dec. 24.—Production of coke in Alabama was not reduced because of the holiday this week. Independent producers have no stocks on hand. By-product foundry coke is held at $5, base, Birmingham. Shipments from Alabama to the Middle West will increase soon after Jan. 1.

Coke Prices

Prices per Net Ton

Beehive Ovens	
Connellsville furnace	$2.60 to $2.65
Connellsville foundry	3.50 to 4.85
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25
By-Product Foundry	
Newark, N. J., del.	$9.00 to 9.40
Chicago ovens	8.00
New England del.	11.00
St. Louis del.	9.00
Birmingham, ovens	5.00
Indianapolis del.	8.25
Ashland, Ky., ov., Connell. basis	6.50
Portsmouth, O. ov., Connell. basis	6.50
Buffalo ovens	8.75
Detroit ovens	9.00
Philadelphia, del.	9.00

Ferroalloys

Contracting Progressing Slowly—Specifications Continue Light

New York, Dec. 24.—Some sellers of ferromanganese report that half their customers have contracted for their requirements. However, business has not developed as fast as anticipated. Merger negotiations in the Middle West are said to have had a retarding influence. The market is $100 per gross ton, duty paid. Domestic spiegeleisen, 19 to 21 per cent, is unchanged at $34 in carload lots.

Pittsburgh, Dec. 24.—Specifications for ferroalloys are light. Contracting for ferromanganese and spiegeleisen is fairly well advanced, although approximately half of the tonnage remains to be placed. Ferromanganese continues $104.79, delivered Pittsburgh, with spiegeleisen $34 for lots up to 100 tons. Ferrotungsten generally is $1.40 to $1.45.

Chicago, Dec. 24.—A fair number of less-than-carload orders for ferromanganese are being placed. Quotations of $34, eastern furnace, for 19 to 21 per cent material, are being made in the carlot spiegeleisen market.

Exports and Imports Off in November

Foreign trade of the United States in iron and steel products, both export and import, declined in volume in November from October. Export shipments totaled 241,829 gross tons, 5815 tons less than October, while imports amounted to 54,041 tons, 9185 tons below the previous month's figure. Scrap was the principal product of the export trade, being 55,565 tons; plain structural shapes, 25,465 tons; skelp, 17,499 tons; tin plate, 16,781 tons; and plates, 16,698 tons.

Canada was the principal market of the month receiving 102,524 tons in all. Other outstanding markets of November were Japan with 42,550 tons; Chile, 14,296 tons; Mexico, 7690 tons; Philippine islands, 7023 tons, and Italy, 6182 tons.

Imports at 54,041 tons, were the second lowest of the year. Pig iron was the principal product received, amounting to 12,702 tons.

Bolts, Nuts, Rivets

Specifications Slow and for Immediate Needs Only

NUT AND BOLT PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Specifications for bolts, nuts and rivets continue slow with most current orders for immediate shipment. Users' stocks generally are light. Railroads are light buyers but considerable tonnage is in prospect. First quarter contracting practically is completed, with current prices steady at 60 to 70 off for bolts and nuts, and 3.10c, Pittsburgh, for large rivets.

Cleveland, Dec. 24.—Specifications for nuts, bolts and rivets again have receded, attributable to holiday influences. Buyers have anticipated their needs for next week and spot buying is small. First quarter contracting has made little progress.

Chicago, Dec. 24.—First quarter contracting for bolts, nuts and rivets is proceeding satisfactorily. While buyers are bargaining to some extent on prices, fourth quarter quotations are being extended without exception. Structural rivets in carload lots are unchanged at 3.20c, Chicago, while small rivets, 7/16-inch and smaller, are quoted at 70 to 70 and 10 off.

Ferroalloy Prices

(In dollars, except ferrochrome)

*Ferromanganese, 78 to 82 per cent tidewater, duty paid	$100.00
*Ferromanganese, del. Pittsburgh	$104.79
Spiegeleisen, 19 to 21 per cent, domestic furnace spot†	34.00
*Ferrosilicon, 50 per cent, freight allowed, carloads	83.50
*Do., less carload	88.50
Do., 75 per cent	130.00 to 15.00
Ferrochrome, 60-70 chromium, 4-6 carbon, cts. per lb. con., del.	11.00
Do., for spot delivery	11.50
Ferreotungsten, stand., lb. cont.	1.45 to 1.50
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plant, net ton	160.00
Do., one ton to carload	170.00
Ferrophosphorus, per ton, carload 17 to 19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic, per ton, carload, 23-25% f.o.b. Anniston, Ala. (24 per cent)	122.50

†Carloads. Differentials apply to large quantities.

*These prices contract, spot $5 higher.

Scrap

Holiday Lethargy Holds Market Unchanged — Weather Delays Shipments—Melt Is Light

SLACKNESS in consumption because of the holiday season and other end-of-the-year influences is holding the iron and steel scrap market at a standstill. Prices are as nearly stationary as can be imagined and the preceding decline seems to have been checked, at least. Some grades are quoted higher.

Chicago, Dec. 24.—Consumer marketing of iron and steel scrap is at a slow pace despite more spirited dealer transactions and a firmer tone in dealer quotations, induced in part by heavy snow, which paralyzed yard production for a time. Buying of heavy melting steel against orders is reported at $13.25, although the consumer range remains at $12.50 to $13. No tonnage consumer sale of melting steel has been made since the Gary steelworks was in the market for $13 steel several weeks ago. Steel angle bars are somewhat weaker, asking prices having been revised downward by some sellers as much as 50 cents. Hydraulic compressed sheets are being traded by dealers at $10.50 to $11, fully 50 cents off the recent market, but no recent consumer sale has been closed. Electric furnace and specialty grades are firmer.

Cincinnati, Dec. 24.—Prices for iron and steel scrap are unchanged, with approaching holidays adding to an already dull market. Consumers show slight interest and dealers seem willing to await a natural demand rather than offer concessions.

St. Louis, Dec. 24.—Iron and steel

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

Steel Works Scrap

HEAVY MELTING STEEL

Birmingham	10.50 to 13.50
Boston, dealers	9.50 to 10.00
Boston, No. 2	10.50 to 11.00
Buffalo, No. 1	14.00 to 14.50
Buffalo, No. 2	12.50 to 12.75
Chicago	12.50 to 13.00
Cincinnati, deal.	12.00 to 12.50
Cleveland, No. 1	13.00 to 13.50
Cleveland, No. 2	12.50 to 13.00
Detroit, No. 1 deal.	12.00 to 12.50
Detroit, No. 2 deal.	9.75 to 10.25
East Pa., del. mill	14.50
N. Y., deal. R. R.	11.50 to 11.85
N. Y., deal. yd.	7.75 to 8.00
Pittsburgh, No. 1	15.00 to 15.50
St. Louis, No. 1	13.00 to 13.50
Valleys, No. 1	15.00 to 15.50

COMPRESSED SHEETS

Buffalo (dealers)	12.50 to 12.75
Chicago	11.00 to 11.50
Cleveland	12.50 to 13.00
Detroit, dealers	11.50 to 12.00
E. Pa. new mat.	13.00 to 13.50
Pittsburgh	15.00 to 15.50
Valleys	14.50 to 15.00

BUNDLED SHEETS

Buffalo	9.50 to 10.00
Cincinnati, deal.	10.25 to 10.75
Cleveland	11.00 to 11.50
Eastern Pa.	11.50
Pittsburgh	14.00 to 14.50
St. Louis	9.00 to 9.50

SHEET CLIPPINGS LOOSE

Chicago	7.50 to 8.00
Cincinnati	8.00 to 8.50
Detroit, dealers	8.50 to 9.00
St. Louis	9.00 to 9.50

STEEL RAILS, SHORT

Birmingham	13.00 to 14.00
Boston, dealers	8.50 to 10.00
Buffalo	17.50 to 18.00
Chicago (3 feet)	15.75 to 16.25
Chicago, 2 ft. and under	17.50 to 18.00
Cincinnati, deal.	17.50 to 18.00
Detroit, dealers	16.00 to 16.50
Pittsburgh (3 ft.)	18.00 to 19.00
Pittsburgh, 2 feet and under	18.50 to 19.50
St. Louis	17.50 to 18.00

STOVE PLATE

Birmingham	11.00 to 12.00
Boston consumers	9.00 to 9.75
Buffalo	12.00 to 12.25
Chicago, net	10.25 to 10.75
Cinn., deal., net	8.75 to 9.25
Detroit, net, deal.	9.00 to 9.50
Eastern Pa.	11.00
N. Y., deal., mill.	7.75 to 8.00
St. Louis	12.00 to 12.50

COUPLERS, SPRINGS

Buffalo	17.00 to 17.50
Chicago	15.50 to 16.00
Eastern Pa.	19.50 to 20.00
Pittsburgh	20.00 to 20.50
St. Louis	14.50 to 15.00

ANGLE BARS—STEEL

Chicago	14.75 to 15.25
St. Louis	13.50 to 14.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	17.50 to 18.00
Cleve. billet and bloom crops	17.00 to 17.50
Eastern Pa.	21.00 to 22.00
Pitts. billet and bloom crops	21.00 to 21.50
Pitts. sheet bar crops	20.50 to 21.00

FROGS, SWITCHES, GUARDS

Chicago	13.00 to 13.50
St. Louis	14.00 to 14.50

SHOVELING STEEL

Chicago	12.50 to 13.00
Cleveland	11.00 to 11.50
St. Louis	13.00 to 13.50

Iron Mill Scrap

RAILROAD WROUGHT

Birmingham	10.00 to 11.00
Boston, dealers	10.50 to 10.75
Buffalo, No. 1	11.00 to 11.50
Buffalo, No. 2	14.00 to 14.50
Chicago, No. 1	13.20 to 13.75
Chicago, No. 2	12.50 to 13.00
Cincinnati, No. 2	12.00 to 12.50
Eastern Pa.	16.00 to 16.50
N. Y., No. 1 deal.	12.00 to 12.50
Pittsburgh, No. 2	15.00 to 15.50
St. Louis, No. 1	12.25 to 12.75
St. Louis, No. 2	13.00 to 13.50

SPECIFICATION PIPE

Boston	8.00 to 9.00
Eastern Pa.	14.00
New York, deal.	9.25 to 9.75

BUSHELING

Buffalo, No. 1	12.50 to 12.75
Chicago, No. 1	10.75 to 11.25
Cinn., No. 1 deal.	10.00 to 10.50
Cinn., No. 2	6.50 to 7.00
Cleveland, No. 1	12.00 to 12.50
Cleveland, No. 2	9.25 to 9.75
Detroit, No. 1 new deal.	10.50 to 11.00
St. Louis, No. 1	9.25 to 9.75
Valleys, new No. 1	14.00 to 14.50

MACHINE SHOP TURNINGS

Birmingham	6.00 to 7.00
Boston, dealers	6.00 to 6.10
Buffalo	9.00 to 9.50
Chicago	6.50 to 7.00
Cincinnati, deal.	8.00 to 8.50
Cleveland	9.00 to 9.50
Detroit	8.00 to 8.25
Eastern Pa.	11.00
New York, deal.	7.00 to 7.50
Pittsburgh	10.00 to 10.50
St. Louis	6.75 to 7.25
Valleys	10.50 to 11.00

MIXED BORINGS TURNINGS
For Blast furnace use

Boston, dealers	5.75 to 6.10
Buffalo	11.00 to 11.50
Cincinnati, deal.	8.25 to 9.25
Cleveland	9.50 to 10.00
Detroit, dealers	9.00 to 9.50
Eastern Pa.	11.00
New York, deal.	7.00 to 7.50
Pittsburgh	10.50 to 11.00

CAST IRON BORINGS

Birmingham, chem.	13.00 to 13.50
Birmingham, plain	6.00 to 7.00
Boston, chem.	9.00 to 9.50
Boston, dealers	6.00 to 6.10
Buffalo	11.00 to 11.50
Chicago	9.25 to 9.75
Cincinnati, deal.	8.25 to 8.75
Cleveland	9.50 to 10.00
Detroit, dealers	9.00 to 9.50
Eastern Pa.	11.50
Eastern Pa., chem.	14.50
New York, deal.	7.00 to 7.50
Pittsburgh	10.50 to 11.00
St. Louis	9.25 to 9.75

PIPE AND FLUES

Cincinnati, deal.	9.00 to 9.50

RAILROAD GRATE BARS

Buffalo	11.00 to 11.50
Chicago, net	11.50 to 12.00
Cincinnati	9.50 to 10.00
Eastern Pa.	11.00
New York, deal.	7.50 to 8.00
St. Louis	11.50 to 12.00

FORGE FLASHINGS

Boston, dealers	8.00 to 8.50
Buffalo	12.50 to 12.75
Cleve. over 10 in.	11.00 to 11.50
Detroit	11.00 to 11.50

FORGE SCRAP

Boston, dealers	8.00 to 8.50
Chicago	17.25 to 17.75
Eastern Pa.	13.50 to 14.00

ARCH BARS AND TRANSOMS

Chicago, net	17.25 to 17.75
St. Louis	19.00 to 19.50

Iron, Steel Works Scrap

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	13.50 to 14.00
Chicago steelworks	10.50 to 11.00
Cleveland	12.00 to 12.50
Eastern Pa.	13.50
Pittsburgh	14.50 to 15.00
St. Louis	10.00 to 10.50

STEEL CAR AXLES

Birmingham	17.00 to 17.50
Boston, ship point	15.50 to 16.00
Buffalo	17.50 to 18.00
Chicago	17.65 to 18.20
Eastern Pa.	20.00 to 21.00
Pittsburgh	20.50 to 21.00
St. Louis	18.50 to 19.00

SHAFTING

Boston, ship point	13.50 to 14.00
Chicago	16.50 to 17.10
Eastern Pa.	19.00
New York, deal.	14.00 to 14.50
St. Louis	17.50 to 18.00

Iron Foundry Scrap

CAR WHEELS

Birmingham, iron	11.00 to 12.00
Boston, iron	14.00 to 14.50
Buffalo, iron	12.50 to 13.00
Buffalo, steel	17.50 to 18.00
Chicago, iron	14.00 to 14.50
Chi., rolled steel	17.00 to 17.50
Cincinnati	12.00 to 12.50
N. Y., iron, deal.	10.50 to 11.00
Pittsburgh, iron	14.50 to 15.00
Pittsburgh, steel	20.00 to 20.50
St. Louis, iron	13.75 to 14.25
St. Louis, steel	16.00 to 16.50

NO. 1 CAST SCRAP

Birmingham, cup	12.00 to 13.00
Buffalo	14.00 to 14.50
Boston, textile	14.00 to 14.50
Chicago, mach.	15.10 to 15.70
Chicago, railroad	14.00 to 14.55
Chicago, agri.	12.35 to 12.90
Cincinnati, mach. cupolas, gross	18.25 to 18.75
Cleveland, cupola	15.00 to 15.50
Detroit, net, deal.	11.50 to 12.00
East Pa., cupola	16.00
N. Y. cup. deal.	10.85
N. Y., del. local foundries	15.00
Pittsburgh, cupola	14.50 to 15.00
San Fran., del.	13.50 to 14.00
Seattle	14.50 to 14.75
St. L. No. 1 mach.	14.50 to 15.00
St. Louis, No. 1	14.00 to 14.50

HEAVY CAST

Boston	10.50 to 11.00
Buffalo, breakable	10.25 to 10.75
Cleve., breakable	12.00 to 12.50
Detroit, auto, net dealers	12.00 to 13.00
Detroit, break. deal	9.50
Eastern Pa.	14.00 to 14.50
New York, deal.	9.75 to 10.50
Pittsburgh	11.50 to 12.00

MALLEABLE

Boston, railroad	18.50 to 19.00
Buffalo	17.00 to 17.50
Chicago, agri.	13.75 to 14.25
Chicago, railroad	15.50 to 16.00
Cinn., R. R. deal.	15.25 to 15.75
Cinn., agri., deal.	14.25 to 14.75
Cleveland, rail	17.00 to 17.50
Detroit auto deal.	14.50 to 15.00
St. Louis, rail	14.00 to 14.50

Miscellaneous Scrap

RAILS FOR ROLLING
5 feet and over

Birmingham	13.00 to 14.00
Boston	10.50 to 10.75
Buffalo	14.00 to 14.50
Chicago	14.50 to 15.00
Eastern, Pa.	15.50
New York	10.50 to 11.00
St. Louis	14.50 to 15.00

LOCOMOTIVE TIRES

Chicago, cut	17.25 to 17.75
St. Louis, No. 1	14.50 to 15.00

LOW PHOS. PUNCHINGS

Chicago	14.75 to 15.25
Pittsburgh	19.00 to 19.50

scrap continues dull. In some quarters the melt holds up well, and there have been calls for small tonnages of special material for immediate delivery. All such requirements are easily filled by the dealers, but round lots of any classification are almost entirely absent.

Boston, Dec. 24.—Some buying from mills at Pittsburgh has brought about a slightly firmer price in scrap materials.

New York, Dec. 24.—Scrap continues to mark time, with little fresh consuming inquiry and with dealers' buying prices virtually unchanged. Trading is so slack as to make for nominal prices on some grades, especially in wrought grades.

Buffalo, Dec. 24.—Except for some small shipments of stove plate to a Buffalo district consumer the scrap market is entirely without activity. Prices are nominal and there is little inquiry.

Philadelphia, Dec. 24.—Following several sales of moderate and round lots of heavy melting steel at $14.50, delivered, one eastern Pennsylvania consumer now is negotiating for a considerable tonnage on which it is offering $14. Otherwise current activity is restricted to small and moderate lots.

Pittsburgh, Dec. 24.—Iron and steel scrap continues in a firm market. Heavy melting steel continues at $15 to $15.50 but, due to difficulty in covering, dealers are not interested in large orders at this level. Mill scrap stocks are generally low but new buying awaits the turn of the year. Specialties and low phosphorus grades continue steady.

Cleveland, Dec. 24.—Iron and steel scrap is in the usual quiet period coincident with the holiday period. Steel mill operations continue low and shipments are necessarily few. Shipment of blast furnace material continues in limited volume.

Birmingham, Ala., Dec. 24.—Iron and steel scrap shows little improvement. Heavy melting steel ranges from $10.50, the general run, to $13.50 for best quality.

Toronto, Ont., Dec. 24.—While improvement is reported in future delivery, spot demand for iron and steel scrap is slack. Mills are out of the market and there is limited demand for steel scrap in the Toronto and Hamilton districts, and only small business developing in Montreal. Iron grades have a better call, with machinery cast predominating. Prices are unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$22.00
Steel axles	20.00
Car wheels	16.00
Stove plate	13.00
Wrought pipe	6.00
Turnings	6.50
Heavy melting steel	8.00

TORONTO

Steel axles	15.00
Iron axles	17.00
Heavy melting steel	9.50
Turnings	7.50
No. 1 mach. cast (net)	16.00
Malleable (net)	12.50

Semifinished Steel

Tonnage Lacking—Lower Pittsburgh Prices Expected for First Quarter

SEMIFINISHED STEEL PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Lack of first quarter semifinished tonnage is deferring formal announcement of a price for that period by local producers. Opening of books at $34 for rerolling billets, sheet bars and slabs by producers in other districts, however, is expected to be followed by local sellers. Forging billets are expected to take the usual $5 differential. Some contracts already have been signed at $40. Specifications for all descriptions of semifinished steel continue light with consumption holding to the low rate of preceding weeks of this month. Wire rods continue $40 for first quarter. Skelp generally is 1.85c.

Philadelphia, Dec. 24.—The market for billets has been disturbed by reports from other districts of offers at $34, base, Pittsburgh, for rerollers, and $39 for forging quality. So far, however, nothing has been done below $35 and $40, respectively, in this district. Business shows a sharp decline. First contracts for wire rods have been booked at $40, base, Pittsburgh.

Cleveland, Dec. 24.—Specifications for sheet bars, billets and slabs improved slightly during the week, enabling the leading merchant producer here to put on another open hearth, now operating eight of its 14. Books have been open for first quarter at $34, Cleveland and Youngstown, but no contracts been entered, and spot business is light.

Chicago, Dec. 24.—The semifinished market is nominal at $36, base, Chicago, for billets, slabs and sheet bars. Virtually no competitive condition prevails. Despite the $1 reduction in eastern markets sellers here indicate the first quarter quotations may remain $36. Forging billets are unchanged at $41, base, Chicago. Wire rods are $40, Pittsburgh-Cleveland, and $41, Chicago.

Youngstown, O., Dec. 24.—Specifications and new orders for semifinished steel are light. Prices are steady.

Pig Iron

(*Concluded from Page* 1639)

average of the past several years. The representative of a leading Alabama blast furnace interest reports that sales so far this month represent the largest total for any similar period in four or five years. The advance in the price of southern iron has had a strengthening influence in this market, although quotations are unchanged.

Youngstown, O., Dec. 24.—The market for pig iron is quiet, except that the southern buying movement for first quarter is well under way. Prices are unchanged.

Birmingham, Ala., Dec. 24.—Shipments of pig iron have decreased as a result of the holidays. The advance of 50 cents in the base price to $14.50 to $15, Birmingham, has not affected the market. Inventories show a small amount of iron on yards of melters in this district.

Toronto, Ont., Dec. 24.—Spot buying of Canadian pig iron has slowed up, but producers are looking forward to active business early in the New Year. Contracting was fairly active during the week. Inquiries for substantial tonnages are being received. Prices are steady.

Operating Rates

Operations Quiet, Some Mills Down for Holidays

Pittsburgh—Ingot production continues 60 to 65 per cent, with the average closer to the lower figure. Operations of finishing mills are irregular. Several sheet and strip mills planned a complete shutdown but may run several days to complete rush orders. Sheet schedules average around 50 per cent. Tin plate production is 70 per cent or less, with strip mills 30 to 35 per cent. Pipe output is 40 to 50 per cent.

Chicago—Ingot production remains at about 55 per cent for the district, with 22 of the 36 steelworks furnaces active. Illinois Steel Co. has 13 of its 27 furnaces in blast. Youngstown Sheet & Tube Co. and Inland Steel Co. have two and four stacks blowing at Indiana Harbor, and Wisconsin Steel Co. its three furnaces at South Chicago.

Buffalo—Production at the beginning of this week ranged from 40 to 55 per cent in principal steelworks. The two approaching holidays will give the mills a chance to plan early 1930 schedules and will result in accumulation of a fair unfilled tonnage by the beginning of that period, it is expected here.

Youngstown, O.—A better feeling prevails here. Inquiries for first quarter delivery are numerous and specifications for first week of January shipment are being received. Independent steel output this week will be about 30 per cent, that of the Steel corporation 50 per cent. Most of the sheet mill plants will be down for the week, only 45 of the 120 independent units having been scheduled. All these units will suspend for Christmas. Strip mill operations will average about 50 per cent. Independent tin plate mill operations will be at a standstill. Pipe output will not be above 30 per cent. Independent bar mill output will be small and that of the Corporation 50 per cent. Puddling mill operations have been suspended for the week.

Bars

Lack of Forward Buying Prevents Mill Activity—Prospects Hold Promise for New Year

LIKE most year-ends the present week offers little activity in buying or production. Coverage for first quarter lags. Some automotive releases on contracts have been received at Chicago but this outlet is indefinite generally. Most present contracts are for immediate shipment. Prices seem to be holding steadily, despite reports of shading in some localities.

BAR PRICES, PAGE 1637

Chicago, Dec. 24.—Bar and strip mills have felt the stimulus of some fair automotive releases in the week just closed. Sales in several finishing mills are running close to shipments. First quarter contracting, although below normal, has attained more volume this month than was indicated a few weeks ago, and it is believed western mills are in a better position on the quarter's bookings than eastern mills, particularly as to diversification of tonnage. Public utility programs loom in importance. Farm implement and industrial machinery consumers have a good outlook. Most implement makers find 1929 as good a year as any since 1920. Finishing mills are receiving some rush orders for shipment this week, involving materials for automotive lines. It is becoming more common for buyers to specify material for shipment next month. Alloy steel bar mills are operating at irregular rates. Some production is barely 30 per cent, but the average for the district is slightly higher. Soft steel bars are quoted 2.00c, base, Chicago, and it is reported little discussion of prices develops in forward contracting.

New York, Dec. 24.—Most current business on steel bars continues to move at 1.90c, Pittsburgh. Some small scattered business is going at 5 points higher. Trading is relatively light, and deliveries can be made at two to three weeks.

Pittsburgh, Dec. 24.—Merchant bar consumers continue to defer forward buying, resulting in a fair number of orders for immediate shipment. Consumers' stocks are low and although only a moderate tonnage has been placed for shipment after the first of the year, there are indications that there will be a revival in buying early in January. Automotive requirements of alloy steel bars for January are indefinite but mills look for only a moderate tonnage. Despite reports of prices lower than 1.90c, base, Pittsburgh, the market is fairly well established at this level.

Cleveland, Dec. 24.—Occasional small bar tonnages are specified and from time to time contracts are booked in the 1000 to 5000-ton range. Because of Cleveland's diversified industries, bar producers in this and adjacent territories are faring better as far as specifications are concerned than many mills in other sections. More outside mills are meeting the 1.85c, Cleveland, base, figure quoted by local makers.

Philadelphia, Dec. 24.—A considerable portion of first quarter steel bar contracts has been written at 1.90c, base, Pittsburgh, which figure is firm. Bar specifications reflect typical holiday conditions.

Standards Association Joins World Group

The American Standards association has become a member body of the International Standards association, according to the announcement made at the annual meeting of the American association at the Hotel Astor, New York, Dec. 18. As a result of this action all of the national standardizing bodies except those of Great Britain, Canada and Australia are members of the International association. The countries now represented, in addition to the United States, are: Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Hungary, Italy, Japan, Norway, Poland, Rumania, Russia, Sweden, and Switzerland.

William J. Serrill, and Floyd M. Chapman, were re-elected president and vice president, respectively, of the American association.

Car Requirements Grow

Cleveland, Dec. 24.—Members of the Great Lakes Regional advisory board, meeting here recently to discuss prospective freight car requirements for the first quarter of 1930, have estimated that automobile production in 1930 will be within 600,000 cars of 1929. As a result, iron and steel producers dependent upon the automotive industry will require within 10 per cent of the freight cars they needed in the first quarter of 1929 or 20 per cent ahead of the freight cars used in the last quarter of 1929.

Acquires Illinois Plant

Chicago, Dec. 24.—Acquisition of the Western Pipe & Steel Co. of Illinois, with a plant at Blue Island, Ill., by the Western Pipe & Steel Co. of California, with plants at San Francisco, Los Angeles, Fresno and Taft, Calif., and Phoenix, Ariz., is announced by the latter company. The Illinois company produces pressed steel specialties for railroads.

Plates

Large Orders Expected for Gas and Oil Line Development Works —Shipments Are Moderate

PLATEMAKERS in the Middle West look for large orders from fabricators of gas and oil lines early in the new year. They believe an era of huge development is beginning. Current shipments for pipe line work and car building are in fair volume. An order for 12 barges at Pittsburgh calls for 1850 tons of plates and shapes. Prices are steady.

PLATE PRICES, PAGE 1637

Pittsburgh, Dec. 24.—Recent orders for 12 barges require 1850 tons of plates and shapes. Ten are for Keystone Sand & Supply Co. and two for Rodgers-McCrady Co. Barge inquiry is moderate, but improved buying is looked for. Some equipment remains pending and is not expected to be closed before Jan. 1. Plate demand for miscellaneous purposes is off slightly from the November rate. First quarter contracting is light, at 1.90c, Pittsburgh.

New York, Dec. 24.—Plate demand is moderate. Prices are unchanged at 2.00c to 2.05c, base, Coatesville, with deliveries in a week or ten days.

Chicago, Dec. 24.—Gas and oil line development work appears decidedly promising for next year. It is pointed out that an era of huge pipe line work apparently is beginning. Plate mill operations are close to 75 per cent, and shipments for car building and pipe line work have shown a fairly uniform volume since early this month. Shipments are prompt to four weeks. General manufacturing lines have let down to some extent, but heating and ventilating lines and boiler makers are specifying for shipment after the first of the year. The base price for plate material is 2.00c, Chicago.

A local fabricator has booked 2500 tons of plates for refinery work in West Texas, and there are about 2000 tons on inquiry from Oklahoma oil fields.

Cleveland, Dec. 24.—About 800 to 900 tons of plates is required for an order for 25 locomotives placed with Lima Locomotive Works. The plate

inquiry is not yet out. Early action is expected on the 2200-ton line of 48-inch pipe for Detroit. Bids closed Dec. 18. Little progress has been made in booking first quarter contracts.

Bids are being taken on two Great Lakes barges, requiring a total of 2000 to 2500 tons of plates.

Philadelphia, Dec. 24.—Plate demand is fair, and eastern mills are operating above the rate of last December. Some units are shut down this week. Prices are unchanged.

CONTRACTS PLACED

1450 tons, plates and shapes, 10 barges for the Keystone Sand & Supply Co., Pittsburgh, to Dravo Contracting Co.
400 tons, plates and shapes, two barges for Rodgers-McCrady Co., Pittsburgh, to Riter-Conley Co.
325 tons, two accumulators for new pulp plant of Olympic Forest Products Co., Port Angeles, Wash., to Commercial Boiler Works.
225 tons, 500,000-gallon tank and tower, Los Angeles, to Pittsburgh-Des Moines Steel Co.

CONTRACTS PENDING

2000 to 2500 tons, two Great Lakes barges; bids being taken.

Refractories

Demand Seasonal and Below That of November

REFRACTORIES PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Business in refractory material is fair for December but orders are smaller than during November. Steel mills are fairly active in open-hearth furnace relining but there is less of this than had been anticipated in view of the active operating rate during the first nine months. Relining of blast furnace stoves is in good volume and a number of furnaces also are being repaired. New construction work is less active than during preceding months. Consumers continue to maintain small stocks, necessitating prompt shipment. Kiln operations are off moderately from the November rate. Prices are steady and unchanged, with first quality fire clay brick $43 to $46, silica brick $43, chrome brick $45 and domestic magnesite $22.

Boiler Orders Decline

Washington, Dec. 24.—New orders for 1239 boilers were placed in November aggregating 1,160,246 square feet, according to the department of commerce. This compares with 1712 boilers with 1,870,569 square feet in October and 1660 boilers with 1,459,440 square feet in November, 1928. Totals for the 11 months are 17,497 boilers with 18,588,362 square feet, compared with 18,329 boilers with 16,376,686 square feet for the same time in 1928.

Pipe

Utility Inquiries Dominate Market—Lettings Few—Prices Firm—Steel Pipe Interest Wanes

PUBLIC utility needs are forging to the front in an important way. New York inquiries totaling 20,000 tons include one for 8000 tons locally and 3000 tons for Boston. Boston interests also ask for 4000 tons of gas pipe. Los Angeles wants 2255 tons. Steel pipe demand shrinks in all varieties. Springfield, Mass., bought 20,000 feet small water pipe.

PIPE PRICES, PAGE 1638

New York, Dec. 24.—Public utilities gradually are entering the cast pipe market for first half requirements. Inquiries are out for about 20,000 tons. Orders are expected by Jan. 15 and additional inquiries will come out about that time. Several upstate cities are expected to cover on six months' needs soon. Prices are weak, current business being largely confined to scattered carload lots. Export trade is dull. Federal Water Service will require about 8000 tons for the first six months. Kennedy interests at Boston have an inquiry for 4000 tons of gas pipe. Springfield, Mass., closed on 24,000 feet of small steel water pipe.

Boston, Dec. 24.—Current pipe demand is quiet but a utility interest may buy 3000 tons this week and this city is reported in the market for several thousand tons. Private business is good considering the season and prices are firm, makers being less anxious than three weeks ago to allow concessions on large diameter pipe.

Pittsburgh, Dec. 24.—Demand for practically all descriptions of tubular products is slower than last month. Operations are off slightly, partly due to seasonal influences. Jobbers are accumulating little extra stock of merchant pipe and shipments to the oil country are slower. Producers look for a restricted demand in the latter field next year due to efforts to curtail oil production. Moderate improvement in merchant pipe buying is looked for early in the first quarter. Locomotive and boiler tube prospects are favorable. Mechanical tubing demand is restricted by light activity in the automotive industry. Mills operate 40 to 50 per cent.

Cleveland, Dec. 24.—With December and January the two dullest months of the year confronting them, pipe producers do not look for any real tonnage until Feb. 1 or later. In the meantime, small orders occasionally are booked for buttweld, lapweld, seamless and conduit. Some jobbers having accepted their December tonnages, have not yet specified the January.

Chicago, Dec. 24.—Sellers of iron pressure pipe are much encouraged over prospects for public utility buying. Indications are that power plant and gas line work will run into heavy tonnage. Water pipe projects, however, are uncertain. In addition to 8000 tons of pipe and 600 tons of castings for Milwaukee, bids for which were received today, Milwaukee also will buy 181 tons of 36-inch pine. Tonnage is not of sufficient volume to test prices.

Birmingham, Ala., Dec. 24.—Cast iron pipe production is practically at a standstill this week. Some plants will not resume until Dec. 30. A few lettings have been received for 1930 delivery and additional specifications are in sight. Shops are in splendid shape for active production expected to be necessary within a few weeks.

CONTRACTS PLACED

200 tons, 16-inch class B, cement lined, Vancouver, Wash., to American Cast Iron Pipe Co.
100 tons, 6 and 8-inch pipe, Salem, Mass., to Warren Foundry & Pipe Co.

STEEL PIPE

24,000 feet, ¾ to 2-inch steel water service pipe, Springfield, Mass., Cohoes Rolling Mill low and reported to have contract.

CONTRACTS PENDING

8000 tons, various sizes, half year requirements, for Federal Water Service, New York.
4000 tons, 4 to 12-inch, for Kennedy interests for gas installation near Boston.
3000 tons, public utility at Boston, 1930 requirements.
2255 tons, 16 and 24-inch class C and B, Los Angeles; bids Jan. 23.
181 tons, 36-inch pipe for Milwaukee; bids Dec. 31.
134 tons, improvement of Flower street, Santa Ana, Calif.; bids opened.
140 tons, 4 to 8-inch class B, West Salem, Oreg.; bids opened.
118 tons of 36-inch pipe and 32 tons of special castings for Milwaukee; bids close Dec. 31.

Expects More Building

Youngstown, O., Dec. 24.—Truscon Steel Co. is expecting public and industrial construction in 1930 to be heavier than in 1929. The Truscon Steel Co. plants are operating 10 per cent above the corresponding period of a year ago, according to Julius Kahn, president.

Form Industrial Agency

Harry W. Leighton Co., Chicago, has been organized as a manufacturers' railroad and industrial representative

in the Chicago territory, by Harry W. Leighton, who has represented various companies in the middle west for the past 15 years. Mr. Leighton is president of the company and W. E. Thurber, who has been manufacturers' representative for Colonial Tool Steel Co., is vice president and secretary.

Tin Plate

Canmakers' Requirements Holding Up —Mill Operations Lower

TIN PLATE PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Tin plate specifications show little improvement, but are fairly large for December. Indications are that January and February consumption by leading canmakers will compare favorably with the activity of corresponding months of 1929. Mill operations are irregular due to the holiday. Some plants are down for seven days while others will suspend operations only on Wednesday. The average for the district is no higher than 70 per cent. The price continues $5.35 per 100-pound base box, Pittsburgh.

Iron Ore

Consumption Decreases—Stocks Larger Than Year Ago

IRON ORE PRICES, PAGE 1638

Cleveland, Dec. 24.—Stocks on Lake Superior iron ore at lower lake docks and furnaces were 1,419,581 tons larger Dec. 1 than on that day last year, the Lake Superior Iron Ore association reports. The amount of ore consumed in November was 664,888 tons less than in October. The association's report follows:

	Tons
Ore consumed in October	5,365,813
Ore consumed in November	4,700,925
Decrease in November	664,888
Ore consumed in November, 1928	4,897,404
Ore on hand at furnaces Dec. 1, 1929	35,010,075
Ore on Lake Erie docks Dec. 1, 1929	6,489,612
Total at furnaces and Lake Erie docks Dec. 1, 1929	41,499,687
Total, Dec. 1, 1928	40,080,106

Wheeling Steel Buys Tyler Tube & Pipe

Wheeling, W. Va., Dec. 24.—Wheeling Steel Corp. has acquired the Tyler Tube & Pipe Co., Washington, Pa., producer of iron and lapweld open-hearth steel tubes and pipe. The plant has been closed for some time but will be reopened the first of the year, with the employment of 200 workers, according to I. M. Scott, president of the Wheeling company. E. Tyler Davis, president, and William Fogie, secretary, respectively, of the Washington company, will remain on the board of directors.

Vincent Steel Process Co., Detroit, has changed its capital from $12,000 and 850 shares no par value to 4250 shares no par value.

Sheets

Market Activity Lags Under Seasonal Influences—Resumption of Buying Expected After Jan. 1

SHEET producers expect a gradual increase in buying early in the new year. Some contracting has been done, but the majority of large users continue to purchase spot tonnages as required. The automotive industry is moving slowly. Contracting in eastern districts is below the volume of a year ago. Prices are fairly steady.

SHEET PRICES, PAGE 1637

Pittsburgh, Dec. 24.—Improvement noted recently in sheet demand from automotive buyers is slow to expand. Some additional tonnage was placed the past few days and a fair tonnage is entered on books for first quarter, but orders at hand for prompt shipment are moderate. Demand for the other grades is confined mainly to material for current needs, and forward tonnage is being placed slowly. Except occasional price irregularities in certain districts, quotations are steady. Black sheets continue 2.75c, Pittsburgh, with galvanized 3.40c to 3.50c, blue annealed 2.20c to 2.35c for plates and sheets, and 4.00c for autobody. Operations are irregular this week, due to the holiday, with the average around 50 per cent.

New York, Dec. 24.—Sheet prices are moderately steady, with buying light. Contracting for first quarter is substantially under a year ago. Prices are holding at 3.50c, Pittsburgh, on galvanized sheet, with 3.40c available to preferential customers, and 2.75c on black sheets, subject to occasional shading of $1. Blue annealed plates are firm at 2.20c, Pittsburgh, and blue annealed sheets 2.35c.

Philadelphia, Dec. 24.—Sheet mill operations have tapered, and some mills are shut down this week. Few consumers have placed first quarter contracts. Prices continue to reflect an easy situation. Black sheets range from 2.65c to 2.75c, base. Pittsburgh. Galvanized have sold at 3.30c, and now range from 3.30c to 3.40c. Blue annealed plates are held at 2.20c and sheets at 2.35c, but mills are receiving requests for $2 less than these figures because a large share of fourth quarter requirements have been going at 2.10c and 2.25c, respectively.

Cleveland, Dec. 24.—Many northern Ohio sheet mills are shut down for the week. Specifications last week were more active than the week before, especially for automotive material. A local body plant is stepping up its operations gradually. Sheet orders will be increased accordingly within a few days. Prices are unchanged.

Cincinnati, Dec. 24.—Fresh bookings by district sheet mills, some for future requirements, have brought about a slight increase in production schedules. Some of the automobile factories have issued first quarter specifications.

Chicago, Dec. 24.—While a fair amount of sheet contract tonnage is being booked, prompt orders largely are for carload lots. Prices on black sheets are unsettled, but the mill prices now quoted are based on 2.85c. Mill quotations for No. 24 galvanized sheets are 3.50c to 3.60c, while blue annealed sheets are unchanged at 2.30c for No. 10 and 2.45c for No. 13 gage. Mill operations are about 50 per cent.

St. Louis, Dec. 24.—Demand for sheets is holding up fairly well. Some new orders have been booked, and specifications are above expectations. Prices are steady.

Youngstown, O., Dec. 24.—Empire Steel Co.'s advance of $2 a ton to 2.85c for common black sheets emphasizes the firmer price situation in the sheet market. Good orders for autobody sheets will keep most of the valley plants that are making this grade busy all this week. Other mills will finish on Tuesday and stay down the remainder of the week. Some will resume Thursday. Sheetmakers have 48 units active this week, out of 120 for the independents.

Plate Orders Increase

Washington, Dec. 24.—November orders for fabricated plates increased over October, but were somewhat lower than November, 1928, according to department of commerce. Total for 11 months, compared with the same period last year, is also less as noted in the following table:

1928	Total	Oil storage tanks	Gas holders	Blast furnaces	Stacks and miscellaneous
November	54,418	32,381	2,081	563	10,731
Total (11 mos.)	492,369	227,611	29,507	7,978	169,276
December	40,441	15,152	2,216	336	12,840
Total (year)	532,810	242,763	31,723	8,314	182,116
1929					
January	32,705	11,055	2,018	325	11,567
February	58,684	16,093	6,356	95	18,468
March	57,869	22,045	5,656	631	15,274
April	40,675	9,984	2,483	2,462	23,167
May	47,763	10,087	5,300	1,245	26,118
June	45,918	6,890	5,444	1,003	26,200
July	48,968	14,963	5,352	2,650	20,988
August	39,702	11,150	3,317	115	19,341
Sept.	41,653	15,189	3,353	200	16,123
October	*32,099	8,786	985	853	15,766
November	41,287	9,033	1,857	1,019	13,493
Total (11 mos.)	487,323	135,275	42,121	10,598	206,505

*Revised.

Federal Die Sets, New York, has changed its name to Standard Die-Sets Corp.

Structural Shapes

25,500 Tons New York Subways Let—Awards Total Less but Still Are Numerous—Prospective Work Involves Large Total

DESPITE a drop from last week's record total, structural awards are fairly numerous for the year's final week. At least 14 lettings call for 1000 to 18,700 tons apiece, the latter a New York subway. A paper plant in Maine takes 3500 tons. Power houses lead Chicago awards and inquiries. Apartments still play important part in New York. Chicago's fabricating shops are active producing material for car building, agricultural implements as well as construction. Many projects are being deferred until after Jan. 1. Both Pittsburgh, New York and Cleveland report much bridge work under contemplation. Plans are approved for initial $1,000,000 building for Chicago 1933 world fair. Fabricators are active, sustaining shape specifications. Prices are fairly steady.

STRUCTURAL SHAPE PRICES, PAGE 1637

New York, Dec. 24.—Lettings declined following the heavy volume of business placed last week, which included the 55,000-ton Empire State building reported in this column exclusively. Shape buying continues seasonally high, a large tonnage being up for figures. Several bridges are due to be placed early in 1930. More small projects are coming into the market. Shape mills have stepped up output in at least one instance and fabricating shops are operating at high rates, especially the larger plants. One fabricator plans to enlarge capacity. Prices are inclined to be firmer. Bethlehem Steel Co. has been awarded 6800 tons for a subway section. American Bridge Co. was awarded another subway, 18,700 tons.

Boston, Dec. 24.—The largest contract awarded in this territory in some time was placed with the New England Structural Co., amounting to 3500 tons. This will go into a paper manufacturing pant at Bucksport, Me. A number of odd tonnages also was awarded. The only large pending project involves 1310 tons for the Edison Electric Co. office building here.

Philadelphia, Dec. 24.—While shape demand is considerably smaller, eastern mills continue able to maintain operations around 75 to 80 per cent. The usual price range is 1.85c to 1.95c, base, mill, for plain standard shapes. Not much tonnage has been entered as yet for first quarter.

Pittsburgh, Dec. 24.—Both awards and inquiries declined recently in the fabricated structural steel market. Prospects continue favorable for improved activity after Jan. 1. Pending work is in good volume, inquiry having been active for some time. Three large bridges are included in the construction program for Allegheny county for next year, including the McKees Rocks, Pa., bridge over the Ohio river. Bids are expected to be asked shortly. Early construction of the Gulf Oil building also is looked for. Plain material continues 1.90c, Pittsburgh.

Cleveland, Dec. 24.—Final award of 1400 tons for the National Town and Country clubhouse here to McClintic-Marshall Co. is the only structural award of note. Large tonnages for local bridge construction, Main street as well as Carnegie-Lorain, are one step nearer. Damage awards in connection with the latter have been made and plans definitely are shaping up for a new bridge in the former case instead of repairing the old. Shape contracts for first quarter are slowly being written. The 1.90c, Pittsburgh, quotation is firm on ordinary tonnages.

Chicago, Dec. 24.—Specifications for light structural material for car building work running into good volume help to keep structural mills occupied at 65 to 70 per cent. Farm implement requirements also take fair tonnages of light material. Most western car shops have backlogs running well into second quarter. Pending public utility work offers encouragement. New inquiries include about 5000 tons for utility companies. Similar tonnage is represented in current awards. A number of the fabricating shops are specifying more stock material to be shipped next month. Plain material is unchanged at 2.00c, Chicago base.

Work on Travel and Transportation buildings for Chicago world's fair of 1933 is to be started April 1, according to official announcement. Plans for the latter, a $1,000,000 building, are already approved.

Birmingham, Ala., Dec. 24.—Fabricating shops will undoubtedly resume immediately after the holiday. Contracts on hand and in sight call for active work. New specifications are in sight and numerous small tonnages are booked regularly.

CONTRACTS PLACED

18,700 tons, subway section 3, route 109, New York, to American Bridge Co., through Taylor-Fichter Steel Construction Co., contingent on approval of general contract going to Thompson, Leopold & Hewitt, low bidders.

6800 tons, subway, section 7, route 108, New York, to Bethlehem Steel Co.

3500 tons, Walton high school, Bronx, N. Y., to Bethlehem Fabricators Inc.

3500 tons, paper plant, Maine Seaboard Paper Co., Bucksport, Me., to New England Structural Steel Co., through Morton C. Tuttle Co., Boston, engineer and general contractor.

3500 tons, power house, Public Service Co. of Northern Illinois, Waukegan, Ill., to Mississippi Valley Structural Steel Co.

2000 tons, building, Viscose Co., Parkersburg, W. Va., to McClintic-Marshall Co.

1900 tons, power house, Northern States Power Co., Granite Falls, Minn., to Minneapolis Steel & Machinery Co.

1600 tons, building, Union League club, Park avenue and Thirty-seventh streets, New York, to Levering & Garrigues Co.

1500 tons, addition to Lakeside plant of Milwaukee Electric Railway & Light Co., to Worden-Allen Co.

1400 tons, clubhouse, National Town and Country club, Cleveland, to McClintic-Marshall Co.

1300 tons, 17-story apartment, 316-320 East Seventy-first street, New York, to Taylor-Fichter Steel Construction Co.

1100 tons, apartment, 433-441 West Thirty-fourth street, New York, to Taylor-Fichter Steel Construction Co.

1000 tons, Roosevelt road bridge, Chicago, to unstated fabricator.

1000 tons, power plant, Oklahoma City, Okla., to Stupp Bros., Bridge & Iron Co.

965 tons, hotel, Washington square, New York, to McClintic-Marshall Co.

800 tons, apartment, Fifty-first street and Keekman place, New York, to Hinkle Iron Co.

600 tons, apartment, East Thirty-first street, New York, to Hinkle Iron Co.

550 tons, three Wisconsin highway bridge projects, to Wisconsin Bridge & Iron Co.

500 tons, city hall, Schenectady, N. Y., to Belmont Iron Works.

500 tons, building, Blair Co., Huntingdon, Pa., to McClintic-Marshall Co.

450 tons, school No. 106, Queens, N. Y., to Bethlehem Fabricators Inc.

400 tons, Armstrong court apartments, Pensacola, Fla., to Worden-Allen Co.

400 tons, miscellaneous bridge work for Duluth, Mesabe & Northern railroad, to American Bridge Co.

400 tons, factory, R. Hoe & Co., Walnut avenue and 137th street, New York, to Reliance Steel Fabricators.

375 tons, theater, Staten island, N. Y., to Hinkle Iron Co.

335 tons, bridge, Erie railroad, Youngstown, O., to McClintic-Marshall Co.

325 tons, hangars Nos. 4, 5, and 6 Valley Stream, Long Island, N. Y., to Jones & Laughlin Steel Corp., through Elby Structural Steel Co., erector.

320 tons, high school, South Gate, Calif., to Brombacher Iron Works.

260 tons, psychopathic hospital, Philadelphia, to American Bridge Co.

200 tons, bridge, Pennsylvania railroad, to American Bridge Co.

200 tons, community center buildings, White Plains, N. Y., to Porcupine Co., through Elby Structural Steel Co., erector.

200 tons, residential building, East Eightieth street, New York, to Easton Structural Steel Co.

135 tons, two bridges, Pennsylvania railroad, to Shoemaker Bridge Co., and Belmont Iron Works.

100 tons, children's courthouse, Staten Island,

Awards Compared

	Tons
Awards this week	57,115
Awards last week	98,030
Awards two weeks ago	22,567
Awards this week in 1928	38,045
Average weekly awards, 1928	39,082
Average weekly awards, 1929	42,213
Average weekly awards, Dec.	50,529
Total awards to date, 1928	2,032,268
Total awards to date, 1929	2,195,093

N. Y., to Stapleton Iron Works.
100 tons, bank, Columbia and Broad streets, Philadelphia, to Shoemaker Bridge Co.
100 tons, bridge span, Cuneo Printing Corp., Chicago, to Wendnagel & Co.
100 tons high school, Bridgeton, N. J., to Devries & Trinkle Iron Works.

CONTRACTS PENDING

4000 tons, apartment hotel, West Forty-seventh street, New York.
2500 tons, power plant building for Waukegan Generating Co., Waukegan, Ill.
2400 tons, Arch street viaduct, Philadelphia.
2000 tons, highway bridge, Philadelphia.
1310 tons, office building, Edison Electric Co., Boston.
1300 tons, warehouse, Morris, Wheeler & Co., Philadelphia.
800 tons, bridges, Pennsylvania railroad, New Brunswick, N. J.
800 to 900 tons, state highway bridges, New York; bids close Dec. 27.
600 tons, power plant building for Michigan Limestone & Chemical Co., Rogers City, Mich.
500 tons, school, New Rochelle, New York.
500 tons, plant addition, Dallas Brass & Copper Co., Chicago.
450 tons, Midway theater, Philadelphia.
400 tons, garages and store room, St. Louis Union Electric Light & Power Co., St. Louis.
400 tons, high school, Schenectady, N. Y.
250 tons, garage, Union Electric Light & Power Co., St. Louis.
100 tons, employes building at city farm, Warrensville, O.
100 tons, warehouse, Fairmount Creamery Co., Cleveland.
100 tons, bridge, Atlantic Coast Line.

Barrel Output Low

Washington, Dec. 24.—November production of barrels declined again from the preceding month, but was somewhat higher than the same month last year, according to the department of commerce. Production was 572,621 barrels or 50.8 per cent of capacity compared with 52.5 per cent in October and 48 per cent in November, 1928, as reported by 27 companies operating 31 plants. Monthly comparisons follow:

1928	Production	Shipments	Unfilled orders for delivery within 30 days	Unfilled orders for delivery beyond 30 days
Nov.	563,647	568,353	322,135	624,982
Total, 11 mo.	6,846,672	6,853,813	.....	.....
Dec.	551,113	549,913	246,460	1,110,983
Total (year)	7,397,785	7,403,726	.....	.....
1929				
Jan.	558,492	548,581	319,704	1,342,006
Feb.	567,398	563,532	345,365	1,198,481
March	742,165	743,407	393,941	1,076,317
April	771,584	775,481	333,614	935,430
May	836,532	834,699	316,882	899,090
June	774,853	779,567	644,079	904,920
July	790,175	782,411	377,855	994,842
Aug.	806,574	809,860	358,150	847,509
Sept.	*663,531	*653,890	*302,632	*768,518
Oct.	*629,976	*638,681	*298,550	603,071
Nov.	572,621	567,257	285,295	708,306
Total, 11 mo.	7,713,901	7,697,366	.....	.....

*Revised.

Stacks Make Record

The Republic Iron & Steel Co.'s two blast furnace stacks at Birmingham, Ala., broke production records in November, the two stacks producing 27,660 tons of iron. No. 1 furnace made 14,130 tons of this total, with 12,951 tons its best previous record, made last January.

Concrete Bars

Awards Seasonally Fair—Inquiry Maintained — Quotations Weak in Most Sections

EARLY 1930 work holds much promise for concrete bar fabricators. Contemplated construction by utilities and railroads has important dimensions, especially in Chicago. A 1200-ton subway was let in New York and a 600-ton college building at Chicago. About 1000 tons in five jobs is up in California. New York reports less shading. Other districts are not overly firm.

REINFORCING BAR PRICES, PAGE 1637

New York, Dec. 24.—Concrete bar prices generally are firm with less shading. Warehouse prices at New York are held on large tonnages, 2.70c being minimum, with 1.95c to 2.00c, Pittsburgh, applying to mill stock lengths and the inside figure is infrequent on shipments here. Considerable work is up for action early in 1930. New York Central's west side project is expected to take a large tonnage of bars. Concrete Steel Co. was awarded 1200 tons for a subway section.

Boston, Dec. 24.—Maine's state highway commission is reported to have awarded 300 tons of concrete bars to the Portland Rolling Mills. Smaller lettings of the week aggregated 150 tons. A shoe plant addition at Worcester, Mass., is postponed until next summer.

Pittsburgh, Dec. 24.—Activity in the concrete bar market has declined. Both inquiries and awards are smaller. Prospects are fairly bright, however, for early 1930. Recent lettings include a fair number of jobs involving up to 50 tons apiece. Prices are fairly steady at 2.20c, Pittsburgh, for cut lengths and 1.95c for stock lengths.

Buffalo, Dec. 24.—A district producer sold 362 tons of reinforcing bars for the new city hall and 183 tons for a school. Otherwise the market is quiet with little new inquiry reported. Prices are about 2.215c, Buffalo, on lots shipped direct from steelworks, for new steel, and about 2.565c, delivered, on warehouse lots.

Chicago, Dec. 24.—Forward reinforcing bar tonnage is promising but a holiday lull has developed. Railroad and public utility programs present encouraging outlooks. Chicago & North Western awarded the general contract for concrete highway subway work in Illinois. Award of a 600-ton college building here is outstanding. Billet and rail steel bar prices are unsettled.

Awards Compared

	Tons
Awards this week	2,745
Awards last week	3,457
Awards two weeks ago	4,410
Awards this week in 1928	2,500
Average weekly awards, 1928	6,189
Average weekly awards, 1929	3,656
Average weekly awards, Dec.	5,849
Total awards to date, 1928	321,845
Total awards to date, 1929	304,166

CONTRACTS PLACED

1200 tons, subway, route 108, sections 3 and 4, Queens, N. Y., to Concrete Steel Co.
600 tons, Mundelein college building, Devon avenue and Sheridan road, Chicago, to unstated fabricator.
362 tons, city hall, Buffalo, to Kalman Steel Co.
300 tons, Maine state highway commission, to Portland Rolling Mills.
183 tons, school No. 67, Buffalo, to Kalman Steel Co.
100 tons, state highway bridge, Methow river, Washington, to Northwest Steel Rolling Mills.

CONTRACTS PENDING

400 tons, approaches, Wabash avenue bridge, Chicago.
306 tons, highway work, Los Angeles, county, Sacramento, Calif.; bids opened.
267 tons, bridge on Flower street, Santa Ana, Calif.; bids opened.
159 tons, highway work, San Mateo county, Sacramento, Calif.; bids Jan. 8.
121 tons, highway work, Santa Clara county, Sacramento, Calif.; bids Jan. 8.
119 tons, cell house, Florence, Ariz.; bids opened.
104 tons, for city of Los Angeles; bids opened.

To Junk Rusk Stack

The Texas board of control has ordered the dismantling of the state blast furnace stack and adjacent cast pipe foundry at Rusk, Tex. Originally the project was designed to utilize convict labor. This failed, as did a subsequent effort to produce by free labor. The plant will be torn down and sold for junk.

Edison Medal Awarded

The Edison medal of the American Institute of Electrical Engineers has been awarded to Prof. Charles F. Scott, Yale university, New Haven, Conn., for his contributions to the science and art of polyphase transmission of electrical energy. This award was founded by associates and friends of Thomas A. Edison, and is awarded annually for meritorious achievement in electrical science, electrical engineering or the electrical arts, by a committee consisting of 24 members of the American Institute of Electrical Engineers.

Rails, Cars

Car List to Expand Greatly—Illinois Central to Take 4000—45 Engines Distributed

ACTIVE freight cars pending in the East, numbering 6000, will be greatly augmented before Jan. 1. Recent scattered lettings bring 1929 total above 100,000 and furnish carbuilders with first quarter backlogs. Illinois Central's inquiry will undoubtedly involve about 4000. Canadian National awards 30 engines; will build 10. Chicago looks for 100,000 tons of rails.

RAILROAD TRACK PRICES, PAGE 1638

New York, Dec. 24.—Eastern carbuilders are centering attention largely on requirements of Chesapeake & Ohio and Louisville & Nashville. Both are likely to issue heavy lists before the new year. Texas Co. may close this week on 500 tank cars. Approximately 6000 freight cars are actively pending. Canadian National distributed 40 locomotives.

Birmingham, Ala., Dec. 24.—Pullman Car & Mfg. Corp. will build 25 all-steel box cars for the Birmingham Southern railroad, subsidiary of the Tennessee Coal, Iron & Railroad Co. The Pullman corporation is to bid on Louisville & Nashville's car requirements.

Pittsburgh, Dec. 24.—Local car builders are closing the year with fairly good backlogs. Reading's recent award adds 1400 cars to unfilled orders of the Pressed Steel Car Co., Standard Steel Car Co. and Bethlehem Steel Co. The two local plants have sufficient business to carry them through most of the first quarter. New business in fastenings is limited. A fair volume of business remains to be placed. Light rails and rerolling rails continue quiet.

Chicago, Dec. 24.—Rail mills operate slightly above 85 per cent. Producers booked about 20,000 tons of rails during the week in several scattered lots, including some for frogs and crossings. Estimates are that about 100,000 tons of rails remain to be placed in the next 30 days. It is indicated also that track fastenings in heavy tonnages will be bought within several weeks. The 14,000 tons of track accessories for New York Central are reported to have been closed, about 50 per cent coming to this district.

The total number of standard car units awarded this year is reported here at slightly more than 100,000. Of this number 70 to 75 per cent has been awarded to car building plants in western territory. It is stated definitely that Illinois Central will be in the market early next year for freight equipment, which may total 4000 cars.

CAR ORDERS PLACED

Birmingham Southern, 25 all-steel 50-ton box cars to Pullman Car & Mfg. Corp.
Canadian National, 20 baggage and 15 express refrigerator cars, to National Steel Car Co.
International Railways of Central America, one passenger-baggage gasoline rail motor car and one passenger trailer, to the J. G. Brill Co.

LOCOMOTIVE ORDERS PLACED

Canadian National, 40 locomotives: 18 to Canadian Locomotive Co., 12 to Montreal Locomotive Works, and 10 switch engines to own shops.
Chicago, Burlington & Quincy, 10 gas-electric engines.
Missouri Pacific, five locomotives to American Locomotive Co.

RAIL ORDERS PLACED

Atlantic Coast Line, 7000 tons to Tennessee Coal, Iron & Railroad Co.; this in addition to 23,000 tons recently noted as going to Bethlehem Steel Co.

CAR ORDERS PENDING

Canadian National, 23 miscellaneous coaches.
Chicago & North Western, 200 suburban coaches.
Chicago North Western, 200 suburban coaches, contemplated for purchase next year.
Chicago, Milwaukee, St. Paul & Pacific, 2300 cars noted last week includes 700 50-ton box, 1000 gondolas and 600 flats.

LOCOMOTIVE ORDERS PENDING

Union Pacific, 25 passenger locomotives, contemplated.
Union railroad, one locomotive.

Belfont Receivers Report

Cincinnati, Dec. 24.—Receivers for the Belfont Steel & Wire Co., Ironton, O., have filed a preliminary statement in the United States district court here. Notes and accounts payable by the creditor's committee total $58,025. Accounts receivable total $46,176. Salaries payable and other items which receivers have been authorized to pay from funds at hand total $11,535. Reports of liabilities of the company prior to formation of the creditors' committee July 25, 1927, show total unsecured debt at $466,848, with contra accounts receivable $6478. The receivers, D. P. Croxton and I. P. Blanton, have been authorized to sell on consignment nails valued at $18,345, wire $32,055, raw materials $1907 and barbed wire $4216.

Steel Employment Shows Slight Decrease

Washington, Dec. 24.—Employment in the iron and steel industry declined 1.7 per cent in November compared with October, according to the bureau of labor. Employment in foundries and machine shops decreased 3.4 per cent. The automobile industry, which in the three preceding years has shown declines of 8.1 to 9 per cent in employment in November, reported a decrease of 17.3 per cent in number of workers, and 22 per cent in payroll totals.

Employment in the shipbuilding industry in November compared with the same month of last year showed an increase of 34.2 per cent, while employment in the machine tool industry increased 15.6 per cent. Automobile employment in November compared with the same month of last year decreased 23.1 per cent.

Tractor Sales Lower

Washington, Dec. 24.—Shipments of electric trucks and tractors for November declined sharply from October and were also less than October, 1928, according to the department of commerce. Totals for 11 months, compared with the same period last year, however, show a gain of more than 44 per cent. Monthly comparisons follow:

	Domestic Tractors	All other Types	Exports
1928			
November	9	117	6
Total (11 mos.)	96	1,089	128
December	10	126	17
1928 Total	106	1,215	145
1929			
January	4	129	1
February	10	121	3
March	14	187	10
April	12	169	13
May	28	174	9
June	17	168	16
July	18	145	5
August	15	129	10
September	21	*130	7
October	14	*120	*33
November	9	99	8
Total (11 mos.)	162	1,571	133

Stoker Sales Decline

Washington, Dec. 24.—November sales of mechanical stokers declined sharply from October and were also lower than October, 1928, according to the department of commerce. Totals for the 11 months, however, show a gain, as compared with the same period last year. Monthly comparisons follow:

	Stokers sold	Fire tube boilers	Water tube boilers
1928			
November	116	54	62
Total (11 mos.)	1,388	513	875
December	102	34	68
Total (year)	1,490	547	943
1929			
January	97	36	61
February	80	26	54
March	117	42	75
April	141	41	100
May	174	64	110
June	203	82	121
July	186	88	98
August	199	94	105
September	155	71	84
October	178	89	89
November	107	43	64
Total (11 mos.)	1,637	676	961

*Revised.

Great Lakes Engineering Works, River Rouge, Mich., has increased its capital from $2,500,000 to $3,000,000.

Strip

Production at Low Point—Current Orders Are for Immediate Shipment—Prices Steady

MANY strip mills have closed for the week, but needs of consumers for prompt material may cause a few days operation in some cases. Automotive needs are slow to develop. First quarter contracts are for small tonnages. At Chicago hot-rolled strip users are inquiring for first quarter requirements in promising way. Hot-rolled needs seem greater than cold-rolled.

STRIP PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Strip steel operations are at a low ebb this week, with some mills closed. A moderate pickup in demand for prompt material may necessitate operating for one or two days, however. Most current orders are for immediate shipment although some material has been booked for delivery after the first of the year. Automotive consumers are slow to place forward tonnage and little more than a moderate improvement in demand is expected before February. A fair number of first quarter contracts has been placed, mostly small tonnages. Prices are well observed on current orders, with hot strip continuing 1.90c and 2.00c, Pittsburgh, and cold strip 2.75c.

Philadelphia, Dec. 24.—Several strip contracts have been closed for first quarter here at 1.80c to 1.90c and 1.90c to 2.00c base, Pittsburgh, for hot strip and at 2.65c to 2.75c base, Pittsburgh, for cold.

New York, Dec. 24.—Demand for strip steel is quiet and prices remain unchanged.

Cleveland, Dec. 24.—Paucity of orders in both hot and cold strip steel still is manifest. Some buyers have specified fair quantities of automotive material for first quarter delivery. Producers are taking advantage of this situation to close down mills for the entire week. Makers still quote 1.90c to 2.00c, Pittsburgh, on hot and 2.75c, Cleveland, on cold. Any concessions recently noted have been on small lots for quick delivery, makers having been willing to take on some material at sacrifice prices for prompt rollings.

Chicago, Dec. 24.—Fairly promising inquiry is reported in first quarter requirements for hot-rolled strip steel. Contract sales are moderately active. Small tonnage releases have just been received from automotive lines. Hot rolled strip operations are about 50 per cent. Quotations for hot-rolled strip are 2.00c to 2.10c, Chicago. Cold-rolled strip mills have extremely light operations. The quotation is nominal on the basis of 2.75c, Pittsburgh-Cleveland.

Algoma Starts Mill

Toronto, Ont., Dec. 24.—Algoma Steel Corp. is putting into operation its new 18-inch merchant mill at Sault Ste. Marie, Ont., and early in January expects to have the new 12-inch mill completed. The new mills will double the capacity of the former ones, giving the Sault Ste. Marie plant an annual capacity of 50,000 tons. It is reported that the Algoma corporation plans installing a new rail mill capable of rolling rails up to 105 pounds.

Acme Machine Products Co., Kalamazoo, Mich., has changed its capitalization from $200,000 preferred and $375,000 common to $24,390 preferred. $8500 common and 100,000 shares no par value.

Cold Finished Steel

Auto Releases and First-Quarter Contracts Lag

COLD FINISHED PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Cold-finished steel bar demand remains steady but little improvement is shown compared with early December rate. Although some material is moving to automotive interests, releases from that industry are slow. Most specifications are for prompt shipment. The 2.20c, Pittsburgh, price continues steady, with first quarter contracting slow. A number of contracts are being continued, however.

Cleveland, Dec. 24.—The early part of the month was better than the last half in cold finished bars. Customers are indifferent about signing first quarter contracts. Some look for a price drop to levels recently named in Detroit by producers badly in need of prompt tonnage. Makers say that the 2.20c, Cleveland, price is absolutely minimum for first quarter.

Wire

Demand Is Light, with Slightly Improved Automotive Specifications—Weather Retards

RESTRICTED business marks the wire trade though some stirring of interest is discernible on the part of automotive suppliers. Barbed wire and fencing is more active in the South. Weather conditions have dampened demand in some sections. Contracting for first quarter is slack, but considerable tonnage in small lots has been booked. Prices are not disturbed by low buying.

WIRE PRICES, PAGE 1638

Pittsburgh, Dec. 24.—Incoming business in wire products continues light, although there is a slight improvement in automotive demand. A small tonnage recently was placed for wheel manufacturers. Movement of barbed wire and fencing in the South and Southwest is reported as fairly active for this period. First quarter contracting is slow although most small buyers have placed bookings for that period. The market generally continues $2.40 to $2.50, Pittsburgh, for wire nails and 2.40c for plain wire.

Worcester, Mass., Dec. 24.—Wire is ending the year quietly. Demand is light and December will show a drop from 1928. Prices are being maintained on a basis of 2.55c to 2.65c, base, Worcester, for plain bright wire to dealers.

Cleveland, Dec. 24.—Orders for wire and nails are scarce. Jobbers buy sparingly. Nut, bolt and rivet producers, to whom go most of the wire and wire rod tonnage sold in Cleveland, are busier and intend specifying heavier early in January. Forward commitments are not extensive. Prices tend firmer.

Chicago, Dec. 24.—Wire mills report continued improvement in first quarter contract sales. The outlook has changed perceptibly in the past two weeks. Bookings are on the basis of 2.45c, Chicago or western mills, for wire, and $2.45 to $2.55 for wire nails. A sprinkling of spot orders is reported for prompt shipment, but specifications which started the week in good volume have been cut down somewhat by heavy snow.

New Mill For Tennessee

Birmingham, Ala., Dec. 24.—The $300,000,000 expansion and betterment program of the United States Steel Corp. for its subsidiaries over the next three years will include a second and more modern sheet mill at the Tennessee Coal, Iron & Railroad Co. works. No increase in steel ingot capacity is scheduled.

Nonferrous Metals

Prime Western Zinc Sales Rise but Prices Are Lower—Lead Quotations Hold Steady in Firm Market—Copper Buying Lags

Prices of the Week. Cents a Pound

	Copper			Straits Tin							
	Electro delivered	Lake delivered	Casting refinery	New York Spot	New York Futures	Lead New York	Lead East St. Louis	Zinc St. Louis	98-99% Aluminum	Spot Antimony	Ingot Nickel
Dec. 18	18.00	18.10	17.10	40.62½	41.37½	6.25	6.10	5.47½	23.90	8.37½	35.00
Dec. 19	18.00	18.10	17.10	40.50	41.25	6.25	6.10	5.47½	23.90	8.35	35.00
Dec. 20	18.00	18.10	17.10	39.87½	40.62½	6.25	6.10	5.47½	23.90	8.35	35.00
Dec. 23	18.00	18.10	17.10	39.37½	40.25	6.25	6.10	5.47½	23.90	8.35	35.00

NEW YORK, Dec. 24.—Prime western zinc demand was large in the past week. Increased business, the largest in a long time, followed lower price levels. Lead sales continued active with prices unchanged. Buying of copper, tin, aluminum and nickel remained quiet. Tin prices lost their recent strength through lack of demand.

Brass and copper mill products now show new signs of sales activity. Some buying has been done and more is indicated for the early future. Prices are unchanged.

Copper—Domestic and export business were light in the past week and the price continued steady at 18.00c, Connecticut. Such business as appeared was mostly for prompt shipment, but some was booked for January. It is believed larger buying will be done shortly.

Zinc—Prime wetsern business picked up materially with the drop a week ago to 5.50c, East St. Louis, but subsequently some metal has sold down 2½ to 5 points lower. This business relieved much of the selling pressure, and it appeared as if the lower price would disappear entirely from the market. The situation, while steadier than formerly, was not firm, and news from Europe of the end of the zinc cartel there has caused the market to be more uncertain. The price of zinc is fully 1 cent below the average that has prevailed since the World war. World-wide increase in production and various unsettling factors within the industry make the market unusually difficult to judge. High grade prices have gone down with common metal. Zinc ore was quoted down $1 last week to $35 a ton for prime western grades at Joplin.

Tin—New business has remained light, and this fact has weighed heavily against the constructive news of the merger agreement of four British smelters controlling a large share of world output. Another bearish factor has been the refusal of Banca producers to join in a curtailment program. Moreover, December statistics are expected to be decidedly weak. The other side of the picture is that consumption appears to have passed its low point, and the world market is in more centralized hands than ever before.

Lead—Buying continues active and is well distributed among all classes of users, for prompt and January shipment.

Aluminum—New business appears more promising to sellers. Prices are firm and unchanged.

Nickel—Prices are firm and unchanged. Indications point to a pick-up in sales tonnage soon. Through the past year, the nickel industry has done by far the largest business since the World war.—*Daily Metal Trade.*

Mill Products

Base price cents per pound f.o.b. mill, except where otherwise specified

SHEETS	
Yellow brass (high)	23.25
Copper, hot rolled	27.75
Lead, full sheets (cut ½c more)	10.00
Zinc sheet (100-pound base)	$10.50
Zinc strip (100-pound base)	$9.50
Aluminum, flat sheets, up to 10 gage, 3 to 72 inches wide	31.30
SEAMLESS TUBE	
Yelow brass (high)	28:25
Copper	29.25
RODS	
Yellow brass (high, full turnings)	21.25
Naval brass	24.00
WIRE	
Copper	19.87½
Yellow brass (high)	23.75

Old Metals

Dealers' buying prices, cents per pound

HEAVY RED BRASS	
New York	11.00 to 11.50
Chicago	11.00 to 11.25
Cleveland	11.00 to 11.50
St. Louis	10.00 to 10.25
HEAVY YELLOW BRASS	
Cleveland	7.50 to 8.00
HEAVY COPPER AND WIRE	
New York	14.00 to 14.25
Boston	13.75 to 14.25
Chicago	12.25 to 12.75
Cleveland	13.50 to 14.00
St. Louis	10.00 to 10.50
RED BRASS BORINGS	
New York	10.25 to 10.75
YELLOW BRASS TUBING	
Cleveland	7.00 to 7.50
LIGHT COPPER	
New York	12.00 to 12.25
Chicago	11.25 to 11.75
Cleveland	12.00 to 12.50
St. Louis	10.00 to 10.50
LIGHT BRASS	
Boston	6.50 to 6.75
Chicago	6.00 to 6.50
Cleveland	6.00 to 6.50
St. Louis	5.50 to 6.00
ZINC	
New York	2.75 to 3.00
Cleveland	2.25 to 2.50
St. Louis	2.75
ALUMINUM	
Clippings, Cleveland	13.00 to 14.00
Borings, Cleveland	7.50 to 8.00
Cast, Cleveland	10.00 to 10.25
Cast, Boston	10.50 to 11.00
Cast, St. Louis	10.50 to 11.00

Secondary Metals

Remelt aluminum No. 12	16.25 to 16.50
Brass ingot, 85-5-5-5	15.50 to 15.75

Coke By-Products

Prices Are Firm, With Spot Buying Seasonally Slack

New York, Dec. 24.—Light oil distillate prices are firm. Spot business is light as the year ends. Distributors have booked a satisfactory volume on contract for 1930. Shipments against this new business are expected to start next month. Producers are holding closely to present schedules for new shipments.

Increasing use of benzol in fuel mixtures has been noted in the steady demand for some months and continued heavy buying is expected in 1930. World production of benzol has been 10 to 15 per cent higher. Export business has been active. Buying of toluol has held fairly heavy. Solvent naphtha and commercial xylol are listless as spot demand slackens.

Phenol is unchanged. Producers expect a strong buying movement in phenol next year. Naphthalene trading is dull, although prices are steady as contracting draws to a close. Stocks are heavier. Sulphate of ammonia is slow. Some export business is moving at weak prices, sales being reported at $2 and under at dock.

Coke By-Products

Per Gallon at Producers' Plant in Tank Lots

	Spot
Pure benzol	$0.23
90 per cent benzol	0.23
Toluol	0.40
Solvent naphtha	0.30
Commercial xylol	0.30
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.17 to 0.18
Per Pound at Producers' Plants	
Naphthalene flakes	0.04½ to 0.05½
Naphthalene balls	0.05½ to 0.06½
Per 100 Pounds Delivered	
Sulphate of ammonia	$2.10 to $2.20

About 250 tons of cast iron and cold rolled shafting required for the new plant of the Olympic Forest Products Co., Port Angeles, Wash, will be supplied by the Willamette Iron & Steel Works, Portland, Oreg.

Warehouse

All Lines Quiet—Building Materials Particularly Dull—Price Concessions Made Occasionally—New Cold Bar Extras Coming

YEAR-END quietness prevails among warehouses generally. Building materials such as nails, metal lath, concrete bars and small shapes are especially slow. Price shading is reported in several districts, without affecting quoted levels. Action on new cold finished extras at New York, which may spread to other areas, is not now expected until January or February.

New York—The usual year-end lull is noted by warehouses. Trading is slack, although some prices appear firmer. New cold-finished bars extras, relating to quantity, analyses, special finish, accuracy and cutting, will not be acted upon possibly until February. Some of these conform in large measure to mill extras inaugurated last July.

Philadelphia—Jobbers report the usual preholiday drop in sales. Prices are firm and unchanged.

Pittsburgh—Sales hold close to the early December rate but still are under November tonnage. Small orders characterize buying. Nails and other building materials are less active. Sheet demand is quieter. Occasional price shading is encountered but quotations are unchanged.

Cincinnati—Warehouse prices continue steady. Purchases in small quantities reflect the customary seasonal trend.

Chicago—Despite irregular mill prices for steel sheets, jobbers quotations show no change. Warehouse sales are falling behind December, 1928, in several lines. Nail prices are reported irregular but current sales afford no price test.

St. Louis—Seasonal quietness is reported by iron and steel warehouses. Cold weather has retarded building materials demand. Deferred deliveries are being requested. Sheets are somewhat more active. Prices remain nominally unchanged, but reports of shading continue.

Cancels Iron Rate Rise

Washington, Dec. 24.—Following an investigation, the interstate commerce commission has found that the proposed reduced rates on pig iron, in carloads, from producing points in Alabama, Tennessee, and Kentucky, to St. Louis and related or intermediate points in Illinois and Indiana are not justified. The commission has ordered the suspended schedules canceled and the proceeding to be discontinued.

Warehouse Quotations in Cents Per Pound at Leading Market Centers

STEEL BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	3.00c
Cincinnati	3.30c
Cleveland	3.00c
Detroit	3.00c
Ft. Worth	3.75c
Houston	3.00c
Los Angeles	3.30c
New York†††‡‡	3.25c
Philadelphia*	2.80c
Pittsburgh	2.90c
Portland	3.00c
San Francisco	3.40c
Seattle	3.15c
St. Louis	3.15c
St. Paul	3.25c
Tulsa	3.75c to 4.04c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.30c
Chattanooga	3.25c
Chicago	3.00c
Cincinnati	3.30c
Detroit	3.00c
Ft. Worth	3.75c
New York††	3.25c
Philadelphia*	2.80c
St. Louis	3.15c
Tulsa	3.75c to 4.04c

REINFORCING BARS

Baltimore	3.31c
Boston	3.265c to 3.50c
Buffalo	2.95c
Chattanooga	3.25c
Cincinnati	3.15c
Cleveland	2.25c to 2.44c
Detroit	2.30c to 3.00c
Ft. Worth	3.50c
Houston	3.00c
Los Angeles cl	2.46c
Los Angeles lcl	2.70c
New York	2.90c to 3.30c
Philadelphia	2.77c to 2.92c
Pittsburgh	2.90c to 3.175c
San Francisco cl	2.30c
San Francisco lcl	2.60c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.75c to 4.00c
Youngstown	2.30c to 2.60c

STRUCTURAL SHAPES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chattanooga	3.35c
Chicago	3.10c
Cincinnati	3.40c
Cleveland	3.00c
Detroit	3.10c
Ft. Worth	4.00c
Houston	3.25c
Los Angeles	3.30c
New York †††‡‡	3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	3.75c to 4.14c

PLATES

Baltimore	3.25c
Boston	3.365c
Buffalo	3.40c
Chattanooga	3.35c
Chicago	3.10c
Cincinnati	3.40c
Cleveland, ¼-in. and thicker	3.00c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Detroit, 3/16-in.	3.10c
Ft. Worth	4.00c
Houston	3.00c
Los Angeles	3.30c
New York‡‡	3.30c
Philadelphia*	2.70c
Pittsburgh	3.00c
Portland	3.00c
San Francisco	3.40c
Seattle	3.15c
St. Louis	3.25c
St. Paul	3.35c
Tulsa	2.75c to 4.14c

NO. 10 BLUE ANNEALED

Baltimore	3.60c
Boston 3/16-in.	3.915c
Buffalo	3.50c
Chattanooga	3.75c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.25c
Detroit	3.35c
Ft. Worth	4.50c
Houston	3.90c
Los Angeles	4.00c
New York‡‡	3.50c to 3.90c
Portland	3.75c
Philadelphia*†	3.25c
Pittsburgh**	3.35c to 3.45c
San Francisco	3.90c
Seattle	4.00c
St. Louis	3.45c
St. Paul	3.75c
Tulsa	4.20c to 4.34c

NO. 24 BLACK SHEETS

Baltimore*†	3.75c
Boston	4.85c
Buffalo	4.20c
Chicago	4.05c
Cincinnati	4.05c
Cleveland***	3.75c to 3.90c
Detroit	3.95c
Ft. Worth	4.70c
Los Angeles	4.90c
New York	3.90c
Philadelphia*†	3.90c
Pittsburgh**	3.85c
Portland	4.90c
San Francisco	4.90c
Seattle	5.00c
St. Louis	4.25c
St. Paul	3.89c
Tulsa	4.34c

NO. 24 GALVANIZED SHEETS

Baltimore*†	4.50c
Boston	5.60c
Buffalo	4.70c to 4.85c
Chicago	4.90c
Cincinnati	4.90c
Cleveland***	4.60c to 4.75c
Detroit	4.75c
Ft. Worth	5.50c
Houston	5.40c
Los Angeles	5.30c
New York	4.50c
Philadelphia*†	4.65c
Pittsburgh**	4.85c to 4.95c
Portland	5.50c
San Francisco	5.30c
Seattle	5.50c
St. Louis	5.10c
St. Paul	4.68c
Tulsa	5.10c to 5.35c

BANDS

Baltimore	4.00c
Boston	4.015c to 5.00c
Buffalo	3.65c
Chattanooga	3.45c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c to 3.65c
Detroit 3/16-in. and lighter	3.30c
Ft. Worth	4.25c
Houston	3.65c
Los Angeles	4.15c
New York‡‡	3.75c
Philadelphia*	3.30c
Pittsburgh	3.25c
Portland	4.00c
San Francisco	3.75c
Seattle	4.00c
St. Paul	3.50c
Tulsa	4.50c to 4.69c

HOOPS

Baltimore	4.00c
Boston	5.50c to 6.00c
Buffalo	4.05c
Chicago	3.75c
Cincinnati	4.05c
Cleveland	3.25c to 3.65c
Detroit, No. 14 and lighter	3.80c
New York‡‡	4.25c
Philadelphia*	3.55c
Pittsburgh	4.25c
Seattle	5.00c
St. Paul	4.00c

COLD FINISHED STEEL

	Rounds, Flats, hexagons, squares	
Baltimore (c)	3.50c(a)	4.00c
Boston	3.55c	4.05c
Buffalo	3.95c	4.45c
Chattanooga*	3.85c	4.35c(d)
Chicago	3.60c	4.10c
Cincinnati	3.85c	4.35c
Cleveland	3.65c	4.15c
Detroit	3.85c	4.35c
Los Angeles (a)	4.50c	.....
New York	3.50c	4.00c
Philadelphia*	3.50c	4.00c
Pittsburgh	3.70c	4.20c
Portland (a)	4.50c	.....
San Fran. (a)	4.25c	.....
Seattle (a)	5.00c	.....
St. Paul (a)	3.85c	.....
Tulsa	4.64c	5.14c

(a) Rounds only; (d) Squares only.

COLD ROLLED STRIP

Boston, 0.100-inch, 500 pounds lots	5.30c
Buffalo	5.85c
Chicago (b)	6.10c
Cincinnati	7.15c
Cleveland (b)	5.95c
Detroit	5.80c
New York	5.15c
Philadelphia (c)	5.15c

(b) Net base, straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.

SWEDISH IRON AND STEEL
New York duty paid

Hollow drill steel	13.00c
Iron bars, round	6.10c
Iron bars, flats and squares	6.50c

*Plus quantity differentials. ‡‡Minus quantity differentials. ††Domestic bars. **Less than 25 sheets. *†50 or more bundles.
***Less 0.15c where more than 10 bundles are ordered at once for delivery at one time

Pacific Coast

Much Buying Is in Prospect for 1929 Budget Action—Prices at Unchanged Levels

BECAUSE the closing year lacks funds which will be available when municipal budgets are made in January, some activity on the Pacific coast is held in abeyance but casts its shadow before. Trading is dull, with much promise for the near future. Jobbers at Seattle find trade better than in December, 1928. Carload orders suffice to keep mills operating at a fair rate.

San Francisco, Dec. 21.—(*By Air Mail*)—Iron and steel sales and inquiries are limited. The largest structural letting called for 320 tons for a school in South Gate, Calif., placed with Brombacher Iron Works.

Bars, Plates and Shapes

Lettings of reinforcing steel bars totaled 867 tons, compared with the weekly average for the year of 1584 tons. This brings the total to 80,809 tons, compared with 85,739 tons for the corresponding period in 1928. A fair volume of pending business is up. Bids have been opened on 306 tons for highway work in Los Angeles county, on 119 tons for a cell house at Florence, Ariz., and on 104 tons for Los Angeles. Prices on out-of-stock material in the San Francisco district remain at 2.30c, base on carload lots and at 2.60c on smaller quantities. In the Los Angeles district quotations are $2 a ton higher.

Los Angeles awarded 225 tons of plates to the Pittsburgh-Des Moines Steel Co. for a 500,000-gallon steel tank and tower. Other awards aggregated 1025 tons and brought the total for the year to 248,294 tons, compared with 44,574 tons for the same period last year. Bids open next week on 5000 tons for a pipe line at San Diego. Plate prices remain weak and only small tonnages are going at 2.35c, c.i.f., larger lots being shaded from $2 to $4 a ton.

A number of small structural lettings were placed this week but only one was booked which called for over 100 tons. This project involved 320 tons for a school at South Gate, Calif. No new inquiries of importance developed during the week. Pending business now calls for more than 9800 tons. Bookings this week totaled 400 tons compared with 3600 tons for the weekly average of the year. To date this year 184,815 tons have been placed as compared with 141,374 tons for the corresponding period in 1928. Plain structural shapes remain unchanged and firm at 2.35c, c.i.f.

Cast iron pipe awards this week were confined to small lots. Bookings so far this year total 81,751 tons, compared with 77,320 tons for the same period a year ago. Los Angeles has come into the market for 2255 tons of 16-inch Class C and 24-inch Class B pipe, bids on which will be opened Dec. 23. This is the largest inquiry for over two months. Bids open next week on 3400 tons for San Diego, alternate bids being taken on welded steel pipe.

Coast Pig Iron Prices

Utah basic	$25.00 to 26.00
Utah foundry	25.00 to 26.00
*German	24.25
*Indian	25.00 to 26.00

*C.i.f. duty paid.

Seattle Awaits New Year

Seattle, Dec. 18.—(*By Air Mail*)—Holiday apathy is affecting the iron and steel trade in the Pacific Northwest, there being a disposition to postpone action on a number of important projects until next year.

Bars, Plates and Shapes

Mill quotations on merchant bars and shapes remain unchanged at 2.35c and reinforcing at 2.30c, while 2.30c is the generally recognized price of plates.

Local steel mills are still booking considerable business in car lots while several large contracts for reinforcing are pending and may not be sublet until next month. Northwest Steel Rolling Mills has the contract for furnishing 100 tons of reinforcing for a state bridge at Methow, Wash.

In addition to five digesters, requiring 425 tons of plates, for the Olympic Forest Products Co.'s pulp mill at Port Angeles, booked several months ago, the Commercial Boiler Works has an additional contract for the same project to build two accumulators, 17 x 56 feet, involving 325 tons of plates. For syphons involved in the Kittitas irrigation project, a subcontract for 100 tons of plates is pending.

Finished Materials

While the wholesale jobbing trade is spotty, the month has been satisfactory, showing a greater volume than December, 1928.

The government has purchased from the United States Steel Products Co. 46 tons of sheet steel piling for building a cofferdam in connection with the construction of a pier at Healy, on the Nenana river, Alaska.

Pipe Inquiry Brisk

Inquiries for cast iron pipe are reported unusually brisk and a large volume of new business is expected to be booked within 60 days. Much city work will be awarded as soon as 1930 budgets are available and the outlook is said to be excellent for improved business. In the meantime pipe sales are confined to small orders out of stock. American Cast Iron Pipe Co. has sold 200 tons of 16-inch cement lined pipe to the Oregon-Washington Water Co., Vancouver, Wash.

Will Rail Merger Help Car Buying?

Washington, Dec. 24.—No immediate effect upon the iron and steel industry as regards service, rates or purchasing of materials is expected to result from the interstate commerce commission's formal publication of its plan for consolidating the railroads into 21 district groups. It has, however, been said that a number of carriers were loath to purchase equipment in the amount desirable on account of their uncertain future, and some reaction may result in this direction.

So far as shippers are concerned, the commission's plan would use present main systems as nuclei for somewhat greater ones. In the long run, economies in management and more expeditious service might be one result. However, the plan is not mandatory; in response to an act of congress the commission's plan is a recommendation. If carriers desire to proceed on its basis they are assured of approval by the commission; if they object, there is ample recourse.

Four of the 11 members of the commission concurred only in part. There is disagreement among members of congress whether existing legislation does not enable the commission to force railroads to comply. It is anticipated, however, that while some systems will be built up along the lines proposed, a considerable time will elapse before the 21 systems visioned really become fact. The 21 systems proposed are designated as follows:

Boston & Maine, New Haven, New York Central, Pennsylvania, Baltimore & Ohio, Chesapeake & Ohio-Nickel Plate, Wabash-Seaboard, Atlantic Coast Line, Southern, Illinois Central, Chicago & North Western, Great Northern-Northern Pacific, Milwaukee, Burlington, Union Pacific, Southern Pacific, Santa Fe, Missouri Pacific, Rock Island-Frisco, Canadian National and Canadian Pacific.

Receivers Appointed for Coshocton Iron Co.

Pittsburgh, Dec. 24.—Receivers have been appointed for the Coshocton Iron Co., Monongahela, Pa., subsidiary of the Combustion Engineering Corp., New York, in an equity suit brought in federal court here by the Bethlehem Steel Co. The defendant is claimed to have assets considerably in excess of its liabilities but lacks funds to meet current obligations. Wilfred Wood and Union Trust Co. of Pittsburgh have been appointed receivers.

Low-Carbon Stainless Alloys Reduced

Pittsburgh, Dec. 24.—Prices on low-carbon stainless alloys have been reduced from 1 to 6 cents a pound and quantity differentials for large lots have been instituted, effective immediately, according to the American Stainless Steel Co. This reduction is a direct result of the recent cut in the ferrochrome price. A regrouping of the various mixtures also has been effected.

The new classification of grades containing 0.12 per cent carbon and under include four ranges of chrome, as follows: 15 per cent and under; over 15 per cent to 18 per cent, inclusive; over 18 per cent to 23 per cent, inclusive; over 23 per cent to 30 per cent, inclusive. This compares with the three former ranges of 16 per cent and under; over 16 per cent to 23 per cent, inclusive; over 23 per cent to 30 per cent, inclusive. In the last named mixture, cold-rolled strips have been reduced from 40.00c to 34.00c a pound. Sheets are 5 per cent less in the new prices.

Quantity differentials introduced on finished products include ½-cent on lots over 10,000 pounds to 36,000 pounds of single-shipment orders of one size of bars, billets and tube rounds, sheets, plates and strip. On lots over 36,000 pounds the differential is 1 cent. Orders of 2000 to 10,000 pounds of bars, billets and tube rounds, and 5000 to 10,000 pounds of sheets, plates and strip take base prices with usual small-lot extras.

Canadian Production Off in November

Toronto, Ont., Dec. 24.—Production of pig iron in Canada in November amounted to 86,516 long tons compared with 91,409 tons in October, a decrease of 5 per cent. Basic iron dropped from 63,011 tons to 59,914 tons and malleable iron from 9084 tons to 7160 tons, while foundry iron advanced to 19,442 tons from 19,314 tons. For the 11 months ended with November, cumulative production totalled 1,007,612 tons, against 934,085 tons in the corresponding period of 1928, a gain of 8 per cent.

Ferroalloys were produced in Canada during November to the amount of 7418 tons, a slight decline from the 7675 tons in October. For the year to date production totaled 73,024 tons, against 40,073 tons for the 11-month period of 1928.

Production of steel ingots and direct steel castings for November reached the lowest point for 1929, at 93,648 tons. This was 19 per cent under the 115,674 tons of October. The decline was mostly in steel ingots, which dropped from 110,165 tons to 89,134 tons. Steel castings receded from 5509 tons to 4513 tons.

For 11 months output aggregated 1,297,273 tons, an advance of 14 per cent over the 1,137,160 tons for the corresponding period, and included 1,233,154 tons of ingots and 64,119 tons of direct steel castings.

Sheet Sales and Output Drop in November

Sheet sales reported by independent mills for November, averaging 4480 tons daily, show a decrease of 46 per cent from the daily average in October. Daily production in November, 6802 tons, represents a decline of 34 per cent from the preceding month. Daily shipments of 6907 tons dropped 26 per cent from the average for October.

The National Association of Flat Rolled Steel Manufacturers' complete report for November follows:

	Net tons	Per cent of capacity
Total sales for November	134,391	43.3
Total production	204,071	65.8
Total shipment	207,200	66.8
Unfilled tonnage, Dec. 1	395,696	127.6
Approximate finished stock on hand awaiting shipments	107,056	34.5
Approximate in stock, unsold	71,680	23.1

Total number of hot mills in the United States is 708, having a capacity for November, 1929, of approximately 461,800 net tons and the percentage of the capacity to which the figures shown are related is 67.1.

A comparison of total monthly sales, production and shipments follow:

	Sales	Production	Shipments
January, 1928	302,921	316,541	274,126
February	266,210	330,565	298,420
March	399,441	366,127	359,532
April	284,070	327,909	327,674
May	250,316	349,367	326,324
June	318,902	311,629	308,741
July	333,357	267,685	278,310
August	254,397	329,396	324,691
September	370,936	318,907	322,876
October	344,614	369,243	354,925
November	346,041	358,402	307,790
December	323,421	302,182	296,687
January, 1929	438,390	391,404	362,229
February	389,496	326,468	325,848
March	464,297	364,202	363,648
April	398,206	375,256	377,274
May	279,783	393,430	392,336
June	307,911	337,841	347,989
July	337,222	323,905	344,676
August	282,107	366,734	365,649
September	274,568	302,490	301,330
October	258,810	319,660	291,135
November	134,391	204,071	207,200

Daily averages of sales, production production and shipments follows:

	Sales	Production	Shipments
January, 1929	14,142	12,626	11,685
February	13,910	11,659	11,637
March	14,977	11,748	11,731
April	13,273	12,508	12,576
May	9,025	12,691	12,656
June	10,264	11,261	11,560
July	10,878	10,448	11,118
August	9,100	11,518	11,795
September	9,152	10,083	10,046
October	8,349	10,312	9,391
November	4,480	6,802	6,907

New York Awards Up 50 Per Cent Over 1928

Structural steel contracts in New York territory, exclusive of bridges, subways and similar engineering projects, will be approximately 200,000 tons heavier in 1929 than in 1928.

Tonnage placed last year was 458,259 tons, according to the New York Structural Steel Board of Trade. For 11 months this year the total is 567,151 tons.

Unusually heavy activity in December including the 55,000-ton Empire State building is expected to take the 1929 aggregate above 660,000 tons.

December may establish a record, above the October mark, 85,699 tons, the highest month noted since the organization of the board. Since June structural steel buying in the New York territory has been above normal. The following table gives comparisons:

Month	1929 Tons	1928 Tons
Jan.	27,626	30,204
Feb.	24,609	24,850
March	72,003	32,299
April	37,543	28,214
May	34,575	46,002
June	47,299	38,600
July	57,775	57,147
August	74,566	43,305
Sept.	56,155	39,846
Oct.	85,699	50,264
Nov.	49,301	28,126
Dec.	.....	39,402
Total	*567,151	458,259

*11 Months.

Malleable Output Low

Washington, Dec. 24.—Production of malleable castings fell off noticeably in November compared with the preceding month and November, 1928. Totals for 11 months, however, show an increase over the same period of last year, according to the department of commerce. Monthly comparisons follow:

1928	Production net tons	Shipments net tons	Orders booked net tons	Per cent of capacity operated
Nov.	63,560	58,246	59,664	66.8
Tot. 11 mos.	720,049	695,866	697,708	68.3
Dec.	59,428	56,867	61,182	63.4
Total, year	779,477	752,733	758,890	67.9
1929				
Jan.	73,125	77,231	76,787	77.7
Feb.	73,875	71,093	77,976	77.1
March	83,365	81,063	86,744	87.7
April	83,765	80,999	80,808	87.8
May	81,704	80,534	76,927	83.8
June	72,282	72,378	65,247	75.0
July	70,625	69,665	61,401	73.5
Aug.	68,651	69,240	61,982	70.0
Sept.	59,589	63,049	52,957	62.0
Oct*	65,305	58,749	60,954	67.9
Nov.**	42,762	44,193	35,985	44.0
Tot. 11 mos.	775,048	768,194	737,768	74.1

*Revised.
**Preliminary.

Of 611,000 kilos of wrought iron and steel pipe imported into the Philippine islands in September the United States furnished 552,000 kilos.

Look for Stock Details of Republic Merger; May Round-out Youngstown

CLEVELAND, Dec. 24.—Financial details of acquisition of the Central Alloy, Donner and Bourne-Fuller companies by the Republic Iron & Steel Co. are being worked out. Considering the Interstate and Witherow companies, previously taken over by Central Alloy and Donner, respectively, the new Republic Steel Co.—as it probably will be called—will be the third largest steel producer, with an annual ingot capacity of 4,900,000 gross tons.

Executive headquarters probably will be set up in Cleveland. Offices of the Continental Shares Inc., prime mover in the merger, are in Cleveland, and this Otis-Eaton-Mather investment trust has interests in other iron and steel companies than Republic. T. M. Girdler, new chairman of Republic, has duties with Continental Shares Inc. not restricted to Republic. Operating officials of Republic Iron & Steel Co. probably will remain in Youngstown, O. It is possible that vice presidents will be placed in charge of the various units.

With Cyrus S. Eaton, Cleveland, chairman of Continental Shares Inc., in Arizona for two weeks, further statements will come from Mr. Girdler or E. T. McCleary, president of Republic. It is reported that some public financing, possibly a large bond issue, is in prospect.

The rounding-out of Republic makes it an important producer of practically all finished products except rails and structural material. It also has no blast furnace capacity at Chicago, although acquiring open-hearth furnaces through the Interstate properties, and it does not have any producing capacity on the Ohio river. For this reason some believe units ultimately will be added in the Chicago and either the Pittsburgh or Wheeling, W. Va., districts. The Eaton interests now have holdings in the Youngstown Sheet & Tube Co., Inland Steel Co. and Wheeling Steel Corp.

Patent rights play an important role in the rounding-out of the Republic company. Through its acquisition of Steel & Tubes Inc., in 1928, and a half interest this year in the Fritz-Moon Tube Co., the Republic company is enabled to make electrically welded pipe, in sizes up to 24-inch diameter when a new mill under construction at Youngstown is completed. The Republic process is to pass skelp under a series of rollers which progressively make it circular in shape and enable a continuous welder to close and make a buttweld joint. No metal is added to make the weld and only the edges to be welded are heated. The new mill will give the company a capacity of 30,000 tons monthly at Youngstown, with a labor force 1/24th that required for buttweld or lapweld pipe, and the installation cost is much less. At Youngstown the Republic company also is tinning strip steel by a continuous process.

The Youngstown company is now negotiating for a merger with the Acme Steel Co., maker of strip steel, with two plants in the Chicago district requiring upward of 400,000 tons of billets annually. The Acme plants would give the Youngstown company entry into the strip market. The Indiana Harbor, Ind., plant of the Youngstown company would have to be enlarged to enable it to supply the Acme company's semifinished requirements.

John A. Topping, after completing a half century or more in the steel industry, announces his intention to retire from active business and is resigning as board chairman of the Republic Iron & Steel Co., with which he has been identified continuously since 1906, first as president and since 1908 as chairman. He began his iron and steel career in a minor way with Aetna Iron & Steel Co., Bridgeport, O., and by 1886 had risen to be secretary-treasurer. In 1894 the Aetna company merged with the Standard Iron Co., as the Aetna-Standard Iron & Steel Co., with W. T. Graham as president and Mr. Topping as secretary. In 1898 he succeeded Mr. Graham. By 1900 the company had consolidated with American Sheet Steel Co., later a part of the United States Steel Corp., and Mr. Topping was elected first vice president and director. Resigning in 1903, he reorganized La Belle Iron Works, Steubenville, O., and a year later became president of American Sheet & Tin Plate Co. He resigned in January, 1906, to go with the Republic company. Mr. Topping is a vice president of the American Iron and Steel institute.

Nonferrous Men to Meet

Washington, Dec. 24.—Producers of nonferrous ingot metal, representing more than 75 per cent of national production, have been authorized to hold a trade practice conference under the auspices of the trade commission. G. S. Ferguson, commissioner, will preside. Place and time for the meeting are as yet indefinite.

River Shipments Are Low for November

Pittsburgh, Dec. 24.—River shipments of iron and steel in the Pittsburgh district for November fell to the lowest level since March, according to the United States engineer office here. On the Monongahela, November shipments of 83,189 tons compared with 119,380 tons in October and 143,238 tons a year ago. The Ohio tonnage declined from 119,129 tons in October to 88,011 tons in November, compared with 137,019 tons in November, 1928.

Aggregate shipments for the first 11 months over the Monongahela were 1,142,760 tons, against 1,091,380 last year. The total for the Ohio of 1,135,027 compares with 1,152,445 in the 1928 period. The Allegheny tonnage declined from 8303 in 1928 to 2107 this year. Comparative monthly figures follow:

1929	Allegheny	Monongahela	Ohio
January	.....	80,402	48,470
February	.....	73,360	87,635
March	25	77,908	77,945
April	210	87,581	110,356
May	525	86,722	112,818
June	722	116,157	116,679
July	25	109,051	102,963
August	100	134,426	137,734
September	.....	135,773	150,163
October	.....	119,380	119,129
November	500	83,189	88,011
Total 11 mos.	2,107	1,142,760	1,135,027
1928			
January	330	78,069	69,750
February	335	83,358	72,203
March	725	93,627	92,040
April	470	99,067	105,472
May	1,863	88,340	102,162
June	2,350	75,422	96,156
July	.....	91,834	90,145
August	50	109,738	124,066
September	200	136,227	125,063
October	1,130	131,281	130,809
November	800	143,238	137,019
Total 11 mos.	8,303	1,091,380	1,152,445
December	.....	79,595	78,213
Total	8,303	1,160,975	1,239,973

Steel Corp. May Have Bar Mill at Cleveland

Cleveland, Dec. 24.—Construction of a bar mill at the Newburgh works of the American Steel & Wire Co., giving the United States Steel Corp. a mill as close as any independent to the large automobile market of Cleveland, Detroit and Toledo, is reported in dispatches from New York listing Steel corporation improvements now planned. Cleveland for several years has been a base for local mills for carbon bars, and increasingly makers from other districts are meeting the Cleveland delivered price of local producers. The rumored mill would have an annual capacity of about 200,000 tons. It is expected that cold drawing equipment would be installed.

Industrial Men in the Day's News

Herbert H. Dewey, Vice President, International General Electric Co. Inc., Schenectady, N. Y.

MANY of his 22 years with the General Electric Co. he spent abroad. This fits him well for the vice presidency of the international subsidiary.

HE IS an unquestioned authority as an engineer in connection with high-voltage long-distance transmission of power.

RUSSIA, South America, Australia and other foreign countries have furnished fields for his work as a specialist on public utility projects.

STAUNCHLY American, Herbert H. Dewey has perforce spent a great deal of his time abroad in pursuance of his official duties with the General Electric Co., Schenectady, N. Y. Early this year, as reported in IRON TRADE REVIEW of Feb. 14, he was elected vice president of the International General Electric Co. Inc. His first visit to Russia in the interests of the General Electric Co. was in May, 1927, as assistant general engineer of the company's central station department. He returned to that country in June, 1928, in connection with Russia's plans for the development of its public utilities. These visits and his unquestioned standing as an engineering authority in high-voltage long-distance transmission of power qualified him well for his new duties wherein he exercises supervision over all the interests of his company in connection with its Russian business.

His work abroad, however, has by no means been confined to Russia. Long considered a specialist on public utility engineering development, Mr. Dewey has been called upon on several occasions to travel extensively. In 1919 he visited Chile in connection with the engineering projects of the Chile Exploration Co. of Antofogasta, and the projects of the Braden Copper Co. of Santiago, as well, in supplying hydraulic power to Santiago and vicinity. In 1921 he spent eight months in Australia, assisting in negotiations for electrical equipment for the development and transmission of power from the brown coal fields of Victoria to Melbourne. In fact, ever since 1912 he has had a part in practically every great high-power transmission project in which the General Electric Co. was interested.

Mr. Dewey, whose home is in Schenectady, N. Y., has been with the General Electric Co. for 22 years. He was born in Lawrenceville, St. Lawrence county, N. Y., and was graduated from the St. Lawrence university in 1904. In 1907 he became affiliated with the General Electric Co. as student engineer and in June, 1909, he was assigned to the power and transmission section of the power and mining department. He was in charge of the section from 1916 to 1921, when the power and mining and lighting departments were consolidated under the name of the central station engineering department. In 1921 Mr. Dewey was named assistant engineer of the central station department, which position he held until his latest promotion.

Men of the Industry

B F. FAIRLESS, who as noted last week is one of the principal executives of the new Republic Steel Co., has been president and general manager of the Central Alloy Steel Corp., Massillon, O. He was vice president and general manager of its predecessor, the Central Steel Co., since February, 1926 until its merger with United Alloy Steel Corp. When he left college he became civil engineer for the Wheeling & Lake Erie railroad for eight months and then was made transit man for the Central Steel Co. He progressed through practically every department connected with the production of alloy steels until he became vice president in charge of operations.

B. F. FAIRLESS

Harry T. Gilbert, also identified in an executive capacity with the new merger, has been vice president in charge of sales of the Republic Iron & Steel Co., Youngstown, O., since April, 1928. He previously had been executive vice president of the Sharon Steel Hoop Co., Sharon, Pa. Early experience was gained with the Denver & Rio Grande railroad and Illinois Steel Co., Chicago. He was with W. W. Bierce & Co., New Orleans, representative for the Illinois company, from 1894 to 1904; Foust & Gilbert, Birmingham, pig iron, coke and steel brokers, 1904-5; Sharon Steel Hoop Co., sales manager, 1905-19; executive vice president, 1919-28.

William M. Neckerman, likewise an official in the consolidation, has been vice president in charge of operations, Republic Iron & Steel Co., Youngstown, O., since June 27, 1928. He had been general manager since May 20, that year. After an apprenticeship and affiliation with Henry Aiken, Pittsburgh, engineer, 1891-1901, he went with National Tube Co., McKeesport, Pa., 18 months as engineer in charge of tube department construction; then in charge of engineering of blast furnaces and steel departments; and as superintendent of bloom and slab mills until May 7, 1907. Chief engineer of the Youngstown Sheet & Tube Co., Youngstown, for two years, he went into its operating department as assistant superintendent of pipe mills and then as superintendent of the tube department, until May, 1928.

J. M. Schlendorf, another chief official of the new corporation, has been with the Central Alloy Steel Corp., and Central Steel Co., as vice president in charge of sales since February, 1926. He previously and since early in 1917 had been general sales manager. Prior to that he had spent two years with the purchasing department of the Willys-Overland Co., Toledo, O., and before that spent 14 years with the United States Steel Corp. in the sales organization of the American Sheet & Tin Plate Co.

W. P. Witherow, also occupying executive capacity in the combined companies, was elected chairman of the Donner Steel Co. Inc., recently merged with the Witherow Steel Co. as noted fully on page 1414 of IRON TRADE REVIEW, Nov. 28, 1929.

R. S. Hall, a vice president of the new Republic company in an important way, has been president of Bourne-Fuller Co., Cleveland, since 1920 when the late B. F. Bourne became chairman. He previously had been vice president and before promotion to that office was general manager of sales. He has been with Bourne-Fuller about 30 years.

R. J. Wysor, also on the active staff of the affiliated interests, has been identified with Continental Shares Inc., Cleveland, since he resigned last October as general manager of the Jones & Laughlin Steel Corp., Pittsburgh. He had filled that office since 1928, having been assistant general manager for three years previously. From 1912 to 1925 he was connected with the Bethlehem Steel Co. in the following capacities in turn; chief chemist and engineer of tests, superintendent of blast furnaces, superintendent of service division, assistant general manager of Maryland plant, and assistant general manager of Cambria works. He previously had been metallurgist for the Panama Canal commission, had conducted a consulting laboratory in New York and had been assistant chief chemist, Duquesne works, Carnegie Steel Co.

R. S. HALL

* * *

A. H. Boardman, for many years connected with the purchasing department of the Shell Oil Co., San Francisco, has been appointed San Francisco manager at 39 Stevenson street for the Monarch Foundry Co., Stockton, Calif.

* * *

Adolph Volderauer, secretary and general sales manager of the Vulcan Plow Co., Evansville, Ind., for the past several years and identified with the company for nearly 30 years, has been named vice president to succeed the late G. Arthur Trimble. Mr. Volder-

(*Continued on Page* 1660)

British Steel Prices Are Advanced

Plates and Shapes Up—Pig Iron Advanced in Scotland—Belgian Mills Establish Minimum Levels—Markets Are Quiet

European Headquarters,
IRON TRADE REVIEW,
Caxton House, Westminster, S. W.1

LONDON, Dec. 24—(*By Cable*)—Rising costs of production have led the British Steel association to announce this week advances in prices of shapes ranging from 5 shillings to 7s 6d ($1.21 to $1.82) per ton, and an increase of half crown ($0.61) in the price of plates. These advances apply in all districts except the midlands and South Wales. It is the second on these products made by the British manufacturers this year.

The markets are quiet, plants being closed for a week. Foundries are pressing for deliveries of pig iron. Coke demand is strong and supplies are scarce, ovens being behind with deliveries. Pig iron producers in Scotland have advanced their prices 2 shillings ($0.48) per ton.

A report from Brussels states Belgian mills have decided to establish minimum prices for steel bars, shapes, heavy and medium plates, and semifinished steel. Business in France is fairly brisk. A report from IRON TRADE REVIEW'S correspondent in Berlin states prices are steady, buying by domestic consumers is on a hand-to-mouth basis and some mills are working for stock.

Entente Quota Reduction Aids British Steel

BIRMINGHAM, Eng., Dec. 6.—(*European Staff Service*)—As the Christmas season approaches there are indications of slowing of activity in most producing centers. Buyers are not eager to commit themselves beyond the end of this year and works have in mind the approaching stocktaking season and have no wish to add to stocks.

Published figures of exports from the Tees in November prove clearly that fears entertained in many directions that shipments would be on a much lower scale than in the previous month were justified. The total of iron and steel represents a fall of some 15,000 tons on the month and

Sterling $4.88

there is still a lack of inquiry from the chief consuming countries. The decline in steel exports was 10,000 odd tons and in pig iron some 5000. In the Cleveland district three furnaces went out of blast in November, and it is now apparent that the number at work are ample for present needs. No stocks are accumulating and continental iron on offer is not being taken up. Prices are firm at £3 12s 6d ($17.68) for No. 3. In the east coast hematite trade business is quieter. The chief obstacle is price as consumers are not prepared to pay what producers consider a profitable figure. Fortunately makers are well sold ahead and having small stocks are in a strong position.

In the Midland district the market is dull and most traders complain of a shortage of work. A bright feature is additions to order books of rolling stock makers who have considerably improved their position during the past three months. They are encouraging the use of 40-ton and 20-ton wagons, especially in the transport of fuel from pit to gas and electric works and the storage depots of the railroads themselves.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, December 23	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f. o. b. Ship at Port of Dispatch—By Cable		£ s d		£ s d		£ s d		£ s d
PIG IRON								
Foundry No. 3, Silicon 2.50-3.00	$17.69	3 12 6*	$16.59	3 8 0	$16.59	3 8 0	$17.56	3 12 0
Basic-Bessemer	16.71	3 8 6†	16.59	3 8 0	16.59	3 8 0	16.85	3 9 0
Hematite, Phosphorus 0.02-0.05	19.28	3 19 0	24.82	630*	.....	.....	17.81	3 13 0
SEMIFINISHED STEEL								
Billets	$30.50	6 5 0	$22.20	4 11 0	$22.20	4 11 0	$22.45	4 12 0
Wire rods	41.48	8 10 0	31.11	6 7 6	31.11	6 7 6	30.50	6 5 0
FINISHED STEEL								
Standard rails	$40.26	8 5 0	$31.72	6 10 0	$31.72	6 10 0	$32.21	6 12 0
Merchant bars	1.74c	8 0 0	1.16c	5 5 0	1.16c	5 5 0	1.16c	5 5 6
Structural shapes	1.61c	7 7 6	1.09c	4 19 3	1.09c	4 19 3	1.10c	5 0 0
Plates, ship, bridge and tank	1.77c	8 2 6	1.36c	6 4 0	1.36c	6 4 0	1.36c	6 4 0
Sheets, black, 24 gage	2.18c	10 0 0	2.34c	10 12 6	2.34c	10 12 6	2.33c	10 12 0
Sheets, galvanized, 24 gage, corrugated	2.73c	12 10 0	2.87c	13 1 3	2.87c	13 1 3	2.97c	13 10 0
Bands and strips	2.18c	10 0 0	1.24c	5 12 6	1.24c	5 12 6	1.24c	5 12 6
Plain wire, base	2.07c	9 10 0	1.54c	7 0 0	1.54c	7 0 0	1.73c	7 17 0
Galvanized wire, base	3.05c	14 0 0	1.77c	8 1 0	1.77c	8 1 0	1.98c	9 0 0
Wire nails, base	2.40c	11 0 0	1.54c	7 0 0	1.54c	7 0 0	1.71c	7 15 0
Tin plate, base box 108 pounds	$ 4.58	0 18 9	.....	.....	.....	.....	$ 9.02	1 17 0

*Francs

Domestic Prices at Works or Furnace—Last Reported			Francs		Francs		Marks	
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$17.69	3 12 6	$18.72	475(2)	$17.36	620	$20.37	85
Basic pig iron	16.71	3 8 6	20.09	510(1)	16.24	580	21.80	91
Furnace coke	4.39	0 18 0	6.62	168	5.88	210	5.15	21.50
Billets	30.50	6 5 0	24.43	620	24.92	890	28.99	121
Standard rails	1.80c	8 5 0	1.46c	810	1.63c	1,250	1.53c	140
Merchant bars	1.77c	8 2 6	1.31c	730	1.21c	935	1.54c	141
Shapes	1.77c	8 2 6	1.26c	700	1.21c	930	1.50c	138
Plates, ship, bridge and tank	1.93c	8 17 6‡	1.46c	810	1.46c	1,125	1.72c	158
Sheets, black, 24-gage	2.29c	10 10 0	2.79c	1,550	2.47c	1,900	2.45c	225
Sheets, galvanized 24 gage, corrugated	2.73c	12 10 0	3.55c	1,970	3.12c	2,400	3.81c	350
Plain wire	2.07c	9 10 0	2.02c	1,100	2.15c	1,650	2.45c	225
Bands and Strips	2.18c	10 0 0	1.47c	810	1.46c	1,125	1.79c	164

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 18s 0d ($4.39) f. o. b. Ferromanganese £21 13s 0d ($105.65) delivered Atlantic seaboard, duty-paid. German ferromanganese £15 0s 0d ($73.20) f. o. b.

The equivalent prices in American currency are in dollars per ton for pig iron, coke, semi-finished steel and rails; finished steel is quoted in cents per pound and tin plate in dollars per box. British quotations are for basic open-hearth steel; French, Belgian, Luxemburg, and German are for basic-bessemer steel.

India is building more of her own rolling stock, and South Africa, Australia and New Zealand have bought little recently.

The decision of the Continental cartel to reduce output of raw steel by 10 per cent this month has been noted with interest in the Birmingham district. It is expected this curtailment will react on prices and merchants are taking a somewhat firmer stand in regard to bars although billets were quoted cheaply on the Exchange yesterday. Business has been so poor among Birmingham merchants that rates have been cut to attract orders. Now that output is to be reduced 10 per cent at once instead of waiting for February it is realized that less material will be available for dumping and the tide of low prices is likely to be stemmed. South Wales is complaining bitterly of Continental competition.

Demand for steel in Birmingham is poor except in special materials for motor and cycle trades, which are taking good quantities, and maintain a heavy output. The structural trade is engaged on small contracts but is using iron and steel mainly from stock. The Middlesbrough steel works, however, have secured additional orders for structural material and steel ship plates and the volume of activity is on an improving scale. The Steel association maintains its prices for all heavy material.

The cast iron pipe industry of Derbyshire maintains a good standard of activity. Derbyshire pig iron generally is difficult to obtain as a heavy tonnage has been booked both by ironfounders and makers of light castings. On the Birmingham exchange furnacemen speak confidently of the position. Order books were full and prices firm although it was admitted that consumers are not in any hurry to contract over long periods. Merchants state that they are doing business in small parcels which the furnacemen willingly accept. Forge iron is the only disappointing section of the pig iron department. Gray forge for marked bar makers sells freely but ordinary forge used by makers of lower grades of finished iron is slack. Crown iron producers need more work if mills are to be kept going to the end of the year. Unfortunately they are not able to sell at a remunerative price and are therefore reluctant to pay the high rates quoted for forge material. Chain and cable iron sells slowly. Steel rerollers of the Black Country are quiet and although £8 2s 6d ($39.64) for rerolled bars is named as a minimum it is believed that a good line would be accepted at £8 ($39.04). Unfortunately the merchant is offering Continental steel at £6 7s 6d ($31.10) delivered and takes most of the business.

In the Barrow district the position remains satisfactory in regard to hematite iron and in contrast with other centers such as Birmingham and South Wales there has been no marked falling away. Twelve furnaces are in blast and no stocks are accumulating. Iron of special quality has been in good demand for some months past especially low phosphorus material. Continental consumers are big buyers and a large portion goes to other British centers. In the steel works at Barrow steady employment is maintained on rails, billets, hoops and all classes of special steel sections.

In galvanized sheets the weakness of the past few weeks is continued and works would take orders at £12 10s ($61) both in South Wales and the Birmingham district.

Belgian Trading Stationary as Production Quota Is Decreased

BRUSSELS, Dec. 6.—(*European Staff Service*)—The Belgian iron and steel market is stationary. Prices are maintained at the previous level, but absolutely no business is passing. The market is dominated by the decision taken at the meeting of the European steel entente special committee at Liege Dec. 3; in fact, those decisions were not known in detail, but many people knew the general meaning of the conversations which took place. Dusseldorf it was decided to reduce the output quota by 10 per cent, but the Belgian group realized that such a measure was insufficient, and agreed to reduce not only its quota, but also its production by 10 per cent. The result was satisfactory, and at Liege all groups decided to adopt the same policy; consequently, the production of German, French, Belgian and Luxemburg groups will be reduced by 10 per cent. Thus it will be necessary to wait some days before knowing exactly what was decided.

On the other hand, necessary steps have been taken to combat the serious situation on the export market, and the fall of prices. It has been confirmed that the minimum price of £5 5s ($25.45) for merchant bars will be applied, having been accepted by the members of the entente. The minimum prices for other commodities, semifinished products, beams, etc., will

Franc—2.87c

be fixed at the next meeting of the executive committee, which will be held at Dusseldorf Dec. 14. The renewal of the European steel entente is the most important question to be discussed, but it appears that no serious difficulties will be encountered in this connection.

The wire rod syndicate, which met at the end of last month, was renewed up to Dec. 31, 1931. No change has been made in the actual quota, but a modification of some slight importance has been accepted concerning the regulation of excess tonnage. At the last meeting of the Brussels iron and steel exchange there was no event of any consequence. No business is reported, and prices are the same as quoted at last week's meeting. This condition is probably due, to some extent, to the approach of the holiday season and the end of the year.

Merchant bars are quoted at £5 5s ($25.45). Beams are sold at £4 17s 6d ($23.60) for normal profile and £5 ($24.25) for British sections. Semifinished products are quoted at £4 10s ($21.80) for 2-inch billets and £4 2s 6d ($20) for 6-inch blooms. Sheet bars are at £4 10s 6d ($21.92). Plates are firm.

LuxemburgMakesRecord

Brussels, Dec. 6.—(*European Staff Service*)—During October production of pig iron and steel in Luxemburg was the highest in history. October output included 255,715 tons of basic bessemer and 2880 tons of foundry pig iron.

Output of steel ingots and castings in October included 238,388 tons of basic bessemer, 2296 tons of open-hearth and 1157 tons of electric steel. The following table gives comparative figures, in metric tons:

Mon. ave.	Furnaces on last day	Pig iron	Steel ingots and castings
1913	....	212,320	111,355
1926	40	209,295	186,980
1927	39	227,710	200,595
1928	38	230,840	214,315
1929			
Jan.	38	241,639	224,617
Feb.	38	209,207	195,338
March	38	237,039	221,370
April	38	235,077	226,098
May	38	247,863	229,620
June	38	242,020	218,634
July	38	250,260	235,241
August	38	251,496	238,210
Sept.	38	240,269	223,511
Oct.	38	258,595	242,241

German Trade Heavier

Berlin, Dec. 6.—(*European Staff Service*)—German exports of pig iron, ferroalloys and other iron and steel products, including scrap, in October were larger than September. Among the principal items exported were: merchant bars, hoops and bands, 122,762 tons; plates and sheets, 55,622 tons; semifinished steel, 41,074 tons; forged tubes, 34,875 tons; wire rod and wire, 31,749 tons; rails and railroad track material 25,574 tons; various forgings, 25,262 tons.

Imports in October also exceeded those of September. The principal items imported in October were: merchant bars, hoops and bands, 53,788 tons; semifinished steel, 13.204 tons. Imports of scrap were 32,032 metric tons, and exports totaled 16,188 tons. The following table gives figures:

Mon. ave.	IMPORTS Pig iron	IMPORTS Other iron and steel	EXPORTS Pig iron	EXPORTS Other iron and steel
1926	9,230	95,890	42,730	402,905
1927	23,895	217,505	29,910	347,645
1928	25,535	174,250	24,585	394,575
1929				
Jan.	22,334	154,293	31,820	387,769
Feb.	10,595	101,257	20,861	320,451
March	12,394	112,161	27,090	319,172
April	12,729	141,971	35,904	583,556
May	11,495	158,787	44,275	542,840
June	12,406	164,582	36,483	485,554
July	12,798	164,951	47,784	497,784
Aug.	11,382	154,019	45,968	473,601
Sept.	12,143	136,019	36,388	433,680
Oct.	21,463	136,905	35,918	469,965

Here and There in Industry

Timely Information Which Records Developments in Various Lines of Productive Enterprise

JULIUS ANDRAE & SONS CO., Milwaukee, one of the oldest wholesale houses in the northwestern electrical field, and controlled by the Westinghouse Electric & Mfg. Co., Pittsburgh, for the past five years, will adopt a new title on Jan. 1, the Westinghouse Electrical Supply Co. Inc. At the same time it has amended its corporate articles to provide for an increase in capitalization from $1,500,000 to $3,000,000. Henry P. Andrae, son of the founder of the business, remains as president and treasurer, and J. C. Schmidtbauer as vice president and secretary. The Andrae company recently took over control of the Illinois Electric Co., Chicago and Peoria, Ill., and the Great Northern Electric Appliance Co., of St. Paul, Duluth, and Fargo, N. D.

* * *

LIMA ARMATURE WORKS, Lima, O., Homer E. Reeder president, has bought the Linzee Electric Motor Co., Mansfield, O., and will move its equipment to Lima.

* * *

HEPPENSTALL FORGE & KNIFE CO., Pittsburgh, has changed its name to Heppenstall Co. The company produces forgings, die blocks, shear knives, tongs and electric alloy steel.

* * *

GEORGE L. ENNON CO., Ypsilanti, Mich., recently incorporated, is a reorganization of the E. & B. Mfg. Co., manufacturer of automotive stampings. George L. Ennen is president.

* * *

AMERICAN ROLLING MILL CO., Middletown, O., is to close its plant at Elyria, O., Jan. 1. The plant was bought about two years ago from the Columbia Steel Co. Operations, it is understood, will be transferred to the company's plant at Butler, Pa.

* * *

AUTOMATIC MACHINE PRODUCTS CO., Sandusky, O., recently incorporated with $50,000 capital, has organized by election of George A. Schwer president, William E. Higgins vice president, Irvin A. Higgins sales manager and assistant secretary-treasurer, and Wilbert G. Schwer secretary-treasurer. These officers and Charles E. Higgins form the board of directors. The plant will be at 528 Scott street, Sandusky.

* * *

SURFACE COMBUSTION CO., Toledo, O., has taken a contract for four continuous sheet pack furnaces and a wire patenting furnace. The pair and pack furnaces are of the walking-beam type and will be installed at the Sparrows Point, Md., plant of the Bethlehem Steel Co.

* * *

WESTINGHOUSE ELECTRIC & MFG. CO. will begin production of electric refrigerators at its Mansfield, O., plant the first of next year. The company will discontinue production of radio receiving sets, talking-movie equipment and other supplies used in the radio amusement field.

* * *

OHIO SEAMLESS TUBE CO., Shelby, O., A. C. Morse president, manufacturer of cold drawn seamless tubing, expects to occupy its new addition by the middle of January. Operations of the plant for the first half of January showed a 40 per cent increase over November, largely due to orders from automotive and oil industries and machine and engine builders.

* * *

UNION CHAIN & MFG. CO., Sandusky, O., has opened a district office at 812 Marshall building, Cleveland. F. H. Dalrymple will be in charge as district representative.

* * *

CENTRIFUGAL STEEL INC. has been formed at Sandusky, O., with 50,000 shares no par value, by W. H. Millspaugh, retiring president of the Paper & Textile Mfg. Co., Sandusky, O. The company will take over patents on centrifugal steel castings processes controlled by Mr. Millspaugh. No immediate development is planned.

* * *

EATON, RHODES & CO., Cincinnati, have been appointed sales agents for the Republic Iron & Steel Co., covering Ohio and parts of Indiana, Kentucky and West Virginia. Pig iron made at the company's Birmingham, Ala., plant will be handled by the firm, which has been established as pig iron and coke merchant for many years.

Foundry Survey Presages Prosperous 1930, Especially Initial Six Months

BASED on its survey, conducted at the request of Fred Erb, president of the American Foundrymen's association, *The Foundry*, published by the Penton Publishing Co., Cleveland, states that casting foundry prospects are bright for 1930, especially for the first six months. It says:

The stock market crash failed to dislodge the foundry industry from the stable foundation established during the first nine months of 1929. Foundry operations are equal to or better than in late 1928. Leaders see better business ahead in early 1930. Production is expected to exceed the output of the corresponding period of 1929.

Current production of steel castings is above last year. Bookings for the last six months have been about 72 per cent of capacity, a 19 per cent increase over the same period last year. Production increased 25 per cent in the same period. Orders on hand for general railway car castings are four times greater than a year ago. Larger steel foundries in the Pittsburgh district are operating the same or better than a year ago. Steel roll and rolling mill machinery backlogs are larger than in 1928. Orders for shop steel castings increased the past two months. Chicago steel plants report better business than a year ago.

Business in the gray iron industry has shown a slight decline from the rate in the same period last year due to slackness in the automobile, construction and radio industries. Return to normalcy of these consuming lines would bring a marked increase in gray iron use. Foundries producing equipment for railroads and allied lines are fairly active.

Current operations in cast iron radi-

ator plants are better than during the corresponding period last year. The year has been a record one for radiator manufacturers. Cast iron pipe business is below last year's average at this time but producers expect an increase in business over the early part of 1929.

Malleable casting production in October was 63 per cent of practical capacity, while November is estimated at 60 per cent, compared with 68 and 67 per cent in the corresponding months a year ago. Production in 1929 exceeded 1928 by about 5 per cent. Prospects for 1930 are considered reasonably good so far as railroad and jobbing castings are concerned, and output for the first half will closely approach normal.

Business in the brass foundry industry is not as good as it was in December, 1928, but foundries supplying the automotive industry will be busy for the early part of the year at least. Their schedules approximate those of previous years. Foundries supplying castings for the construction and building industry will prosper without question if contemplated expansions are carried through.

Men of Industry

(*Concluded from Page* 1656)

auer also becomes general manager of the Evansville plant.

C. A. Hines, manager of the Roderick Lean plant, Mansfield, O., was selected general manager of the four plants operated by the Vulcan Plow Co., including Mansfield and Evansville as well as the Hayes Pump & Planter Co., Galva, Ill., and the Peoria Drill & Seeder Co., Peoria, Ill. He also was made treasurer of the Vulcan company, parent interest of the four. He has had 27 years experience in agricultural implement manufacture.

Edwin M. Eichin, chief accountant of the Vulcan company for several years, has been made assistant secretary and treasurer. Dr. Allen Kanavel, serving on the board of directors for several years, has been made secretary.

* * *

C. F. Niemann, president of the Parkersburg Iron & Steel Co., Parkersburg, W. Va., has been elected a director of the United States Glass Co.

* * *

J. Trantin Jr. has become associated as metallurgical engineer with the Fort Pitt Steel Casting Co., McKeesport, Pa., manufacturer of carbon and alloy steel castings by the electric furnace process and a member of the Electric Steel Founders' Research group. Mr. Trantin was graduated from the department of chemical engineering, University of Wisconsin, in 1915. He has served as metallographist for the Illinois Steel Co., as research engineer for the Western Electric Co., industrial engineer for L. V. Estes Inc., and chief metallurgist and director of research for the Pettibone-Mulliken Co.

* * *

H. W. Johnson, vice president of the American Coil Spring Co., Chicago, now is located in Muskegon, Mich., having assumed charge of the company's plant completed there last March.

* * *

Richard W. Nagel, formerly efficiency engineer for the Ex-Cell-O Aircraft & Tool Corp., Detroit, has become sales engineer of the Brown-Morris Corp., Detroit, manufacturer of tools, jigs and dies.

* * *

W. B. Pickup, employed in the sales department of the Positive Lock Washer Co., Newark, N. J., prior to 1925, has returned to the organization as special representative in the marketing of a new type of lock washer.

* * *

C. B. Pollock, vice president in charge of operations of the Monroe, Mich., plant of the Newton Steel Co., Newton Falls, O., has been elected to the board of directors of the Monroe industrial commission, to fill the unexpired term of Frank J. Bohan, resigned.

* * *

C. R. Messinger, president of the Chain-Belt Co., and Fred C. Pritzlaff, president of the John Pritzlaff Hardware Co., Milwaukee, have been elected directors of the newly organized Wisconsin Bankshares Corp., capital stock $100,000,000, to act as a holding company for 27 national and state banks in Wisconsin.

* * *

Frank A. Seedlock, for many years superintendent of the Vixen Tool Co., Newark, N. J., and Newcomerstown, O., has become similarly identified with Filecraft Inc., Cleveland, thus renewing his association with Walter D. Craft, president of Filecraft Inc., after a period of five years. Mr. Craft was secretary-treasurer of the former company from 1909 to 1924.

* * *

J. J. Hartley has been made chief engineer of the Link-Belt Co.'s Pershing road plant, at Chicago. Mr. Hartley formerly was in charge of foundry equipment sales in the western division of the Link-Belt organization. For the past 19 years he has held various positions with the company, and he brings to the engineering department important practical experience, coupled with engineering knowledge. W. L. Hartley, who has been assistant in the foundry equipment sales department, has been appointed manager of that department to replace his brother.

* * *

Bertram G. Parker has been elected president of the Youngstown Foundry & Machine Co., Youngstown, O., to succeed W. J. Wallis, who has been made chairman of the board. Mr. Wallis had been head of the company 40 years and retires at the age of 75. Mr. Parker was vice president and general manager for the past eight years and has been identified with the company for more than 30 years.

* * *

R. R. Graham, plant engineer, Trenton, N. J., works, American Bridge Co., Pittsburgh, becomes assistant division engineer, 30 Church street, New York, effective Jan. 1, according to announcement by James H. Edwards, chief engineer.

F. L. Castleman becomes engineer at Trenton, succeeding Mr. Graham. He has been plant engineer at Pencoyd, Pa. H. B. Castleman is appointed acting plant engineer at Pencoyd, supervised by Mr. Castleman.

Changes in the central district include J. E. Elliott as assistant division engineer, Frick building, Pittsburgh. J. W. Small succeeds him as engineer at Ambridge, Pa.

F. W. Dencer, formerly engineer at Gary, Ind., is now assistant division engineer, western division, with headquarters at 208 South La Salle street, Chicago. C. J. Kennedy succeeds him at Gary.

* * *

George G. Small has resigned as vice president of the United Engineering & Foundry Co., Pittsburgh, effective Jan. 1., retiring from active business. He was affiliated with the United company and its predecessor for 36 years. Mr. Small was born near East McKeesport, Pa., in 1864 and received his education in the public schools and local academies and the Indiana State Normal school at Indiana, Pa. Later he became identified with Apollo Foundry Co. and Apollo Iron & Steel Co. at Apollo, Pa. The latter is now the Vandergrift plant of the American Sheet & Tin Plate Co. He became connected with the Lincoln Foundry Co. in 1893. In 1901, on organization of the United Engineering & Foundry Co., he was made manager of the Lincoln Foundry Co. department. In 1905 he was elected second vice president and in 1915 was made first vice president of the company. Mr. Small has given special attention to the manufacture of chilled, sand and alloy iron rolls, and his wide technical and practical knowledge of this subject have won for him the highest regard of roll-

ing mill officials throughout the country.

* * *

Charles E. Galvin has been elected president of the International Steel Wool Corp., Springfield, O., to succeed J. K. Williams, resigned.

* * *

W. Dow Harvey, formerly with the American Steel Products Co., Macomb, Ill., has been appointed general manager of the Globe Stove & Range Co., Kokomo, Ind.

* * *

Charles E. Mitchell has been made associate manager to assist Arthur J. Tuscany, manager of the Gray Iron institute, Cleveland, in executive work. He has been occupied for 18 years in accounting, merchandising and association promotional work. He was identified with the Bell Telephone Co., Cleveland, as accountant and office manager for 10 years and then took up sales work.

Pails and Tubs Gain

Washington, Dec. 24.—Production of pails and tubs for October increased over September but were lower than October, 1928, according to the department of commerce. A comparison of the totals for the ten months, compared with the same period a year ago shows a decline. Monthly comparisons follow:

(In dozens)

	PAILS, TUBS		OTHER WARE	
1928	Production	Shipments	Production	Shipments
Oct.	153,813	152,258	56,469	54,596
Total, 10 mo.	1,550,910	1,557,309	445,833	423,842
Nov.	131,792	103,290	33,553	34,012
Dec.	112,923	102,802	36,042	23,567
Total	1,795,625	1,763,401	515,428	481,421
1929				
Jan.	151,106	165,745	40,649	36,896
Feb.	151,019	170,813	60,471	43,329
March	211,252	211,516	50,055	49,549
April	165,155	171,722	55,778	55,632
May	176,622	150,501	43,370	38,597
June	98,857	104,762	37,479	35,334
July	105,454	109,841	42,384	44,117
Aug.	107,004	108,461	53,250	54,860
Sept.	113,698	120,297	46,594	52,970
Oct.	129,282	135,197	45,117	49,511
Total, 10 mo.	1,409,449	1,448,855	475,147	460,795

Coke Output Is Lower

Production of by-product coke in November totaled 4,305,256 net tons and of beehive coke 413,300 net tons, a total of 4,718,556 tons, according to the United States bureau of mines. In October output of by-product coke was 4,610,138 tons and of beehive coke 470,200 tons, or a total of 5,080,338 tons. Last November output of by-product coke was 4,133,200 tons and of beehive coke 416,300 tons, a total of 4,549,500 tons.

Obituaries

H. B. WEBSTER, for 15 years manager of the Dallas, Tex., office of Pittsburgh Steel Co., Pittsburgh, died in Dallas Dec. 19. Prior to his affiliation with the Pittsburgh company, he had been connected with the American Steel & Wire Co. He was graduated from the University of Wisconsin, Madison, Wis.

* * *

James Watson, 94, founder of the Watson & McDaniel Co., specialty manufacturer, Philadelphia, died there Dec. 15.

* * *

Clarence M. Wolff, 63, general sales agent for the Hostetter-Connellsville Coal & Coke Co. with offices in Pittsburgh, died there Dec. 15.

* * *

George Kent, 83, retired, former superintendent of the Youngstown Sheet & Tube Co., Youngstown, O., and later superintendent of the Riverside, O., mill, died at Newport, Ky., Dec. 21.

* * *

John C. Waterbury, 49, president of the Waterbury Co., Brooklyn, N. Y., manufacturer of wire rope, died Dec. 20, in a fall from a railroad train at Weehawken, N. J.

* * *

Wallace Delafield Simmons, 62, former president and one of the trustees of the Simmons Hardware Co., St. Louis, died at his home there Dec. 7.

* * *

Clarence M. Wolff, 63, general sales agent for the Hostetter-Connellsville Coal & Coke Co., with offices in Pittsburgh, died at his home in that city, Dec. 15.

* * *

A. Loring Downs, 72, for many years an official of Wheeling Steel Corp. and Whittaker-Glessner Co., died Dec. 19 at Wheeling, W. Va. He was production manager of the latter company for 20 years.

* * *

Carl N. Watson, 61, president of the Watson Elevator Co., Hoboken, N. J., died at his home in Ridgefield Park, N. J., Dec. 13. He was born at Napanoch, N. Y., and in 1914 founded the company which bears his name.

* * *

Eldon B. Pierse, 78, long time owner and operator of the Anderson Bridge & Scraper Co., Anderson, Ind., died recently in that city. Born in Marion, Ind., he had lived in Anderson for 70 years and was prominent in its industrial affairs until his retirement because of advancing age.

* * *

Roy G. Conde, for several years superintendent of the brake beam department, Simplex forging plant, Hammond, Ind., of the American Steel Foundries, Chicago, died unexpectedly at his home in Hammond, Dec. 5. He had been affiliated with American company for more than 29 years.

* * *

Ralph A. Harman, 72, retired banker and railway executive of Cleveland, who died in that city Dec. 12, was at one time president of the Cleveland City Forge Co., and formerly was a director of the Brown Hoisting Machinery Co., Williamson Co., and New Amsterdam Co.

* * *

Charles M. Kendall, 45, assistant engineer in charge of stations, board of transportation, New York, died in that city Dec. 18 following a long illness. Mr. Kendall was a native of Worcester, Mass., and a 1926 graduate of the Worcester Polytechnic institute. He was with the American Bridge Co. for seven years before entering the service of New York.

* * *

George B. Leighton, 65, former president of Leighton & Howard Steel Co., St. Louis, which with other steel companies, was merged in the American Steel Foundries in 1903, died at Hempstead, N. Y., Dec. 20. At his death he was a director in the American Steel Foundries, Allegheny By-Products Coke Co. and New York Railways Co. During the war he was president of the Lone Star Shipping Co.

Steel Company Fails

Pittsburgh, Dec. 24.—Elliott-Blair Steel Co., with plants in New Castle and Mercer, Pa., is in the hands of a receiver. Financial difficulties were encountered due to a depletion of working capital, partly due to purchase of stock from a former shareholder.

Whiting Sales Increase

Chicago, Dec. 24.—The Whiting Corp., Harvey, Ill., reports October and November sales totaling $727,446, 17 per cent over the corresponding 1928 period and 46 per cent over the 1927 period.

CONSTRUCTION *and* ENTERPRISE

Concise Timely Business Building Opportunities from Field of Industry

North Atlantic

NEW HAVEN, CONN.—Bids are being received by G. & O. Mfg. Co., 138 Winchester avenue, for the construction of a 2-story plant building to be used to manufacture airplane radiators. Cost is estimated at $40,000. Westcott & Mapes, 139 Orange street, are architects.

WASHINGTON—Department of commerce has been asked to assist in inducing American airplane manufacturers to locate a plant in Brazil, by Mario Bastos, representative of Henrqiue Lage, Brazilian operator of industrial enterprises. The government would purchase planes and provide funds for experimentation.

BALTIMORE—Kitchen Cabinet Corp., President and Aliceanna streets, is having plans prepared for plant alterations. William Ganter & Associates, Knickerbocker building, are architects.

BOSTON—Boston & Albany railroad, South station, awarded contract for the construction of a power house to J. F. Fitzgerald Construction Co., 38 Chauncey street.

BOSTON—City, care school department, has awarded contract for an addition including shops to elementary school in the North End section. The estimated cost will be about $250,000.

GLOUCESTER, MASS.—City plans to build an airport that will include shop and hangars estimated to cost about $25,000. J. J. Griffin, City hall, is engineer.

MALDEN, MASS.—Bids are being received by the Malden Machine Tool Co., 158 Exchange street, for the building of a 1-story, 60 x 100-foot machine shop on Abbott road. Cost is placed at about $40,000. C. F. Springall, 50 Park street, Boston, is architect.

ROXBURY, MASS.—A building contract for an auto radiator repair shop at 1822 Columbus avenue has been placed by J. J. O'Connell, 78 Fisher avenue.

BLOOMFIELD, N. J.—General Electric Co., Schenectady, N. Y., is said to contemplate construction of a substation here.

BROOKLYN, N. Y.—New York, care board of water supply, Municipal building, New York, C. J. Gillespie, president, has plans for a 1-story pumping station here to cost about $100,000.

BROOKLYN, N. Y.—U. S. Trucking Corp., 17 Battery place, New York, has plans for the construction of a 1-story garage and shop, 78 x 99 feet, here. Estimated cost about $40,000.

ELLICOTTVILLE, N. Y.—Utility Metal Products Corp., recently incorporated for $10,000, will shortly begin production of radiator shields, tool stands and other metal articles, occupying the building recently vacated by Kulp Inc.

NEW YORK—Yankee Metal Products Corp. has moved to a new 1-story plant building at 460 West Thirty-fourth street, which will increase floor space by more than one-third. The new plant will house the complete manufacturing, sales and display facilities of the Yankee corporation, American Auto Lamp Co. and the Alexander Mirroscope.

NIAGARA FALLS, N. Y.—Carborundum Co. has filed plans for a plant addition, 60 x 194 feet, for manufacturing purposes. Construction will be started soon.

ALLENTOWN, PA.—W. J. Gamble Corp., dealer in sheet metal, is receiving bids for the construction of a manufacturing building. Lockwood, Greene & Co., 1 Pershing square, New York, is engineer.

GREENSBURG, PA.—American Oil Co., American building, Baltimore, is having plans prepared for a 1-story bulk oil storage plant here.

PHILADELPHIA—Reading railroad, Reading terminal, has been issued a permit for the construction of a machine shop at 2821 Richmond street.

PHILADELPHIA—George Kessler Contracting Co., 1733 North Marvine street, has been issued a permit for the construction of a boiler house addition for J. Meyer & Son.

PHILADELPHIA—City, care of bureau of street cleaning, has leased the car barns at Sixteenth and Jackson streets, to be used as a garage and service station for motor trucks.

PHILADELPHIA—Monarch Mfg. Works Inc., Salmon and Westmoreland streets, has been issued a permit for the construction of a machine shop.

PITTSBURGH—Rustless Iron Corp. of America, 26 Broadway, New York, is having plans prepared for a new plant in or near this vicinity.

POTTSTOWN, PA.—C. Z. Klauder, 1429 Walnut street, Philadelphia, architect, will take bids about March, 1930, on a 1-story power house for Hill school here.

POTTSTOWN, PA.—Reading railroad, Reading terminal, Philadelphia, has let contract for the erection of an electric cinder handling plant here to Roberts & Shaefer Co., 400 North Michigan avenue, Chicago.

YORK, PA.—Brandt-Warner Co. Inc. advises it has awarded contract for a plant addition, containing 22,000 square feet, to cost $50,000. Equipment to be installed will include heat treating apparatus, lathes, grinders, etc., which will approximate another $50,000. (Noted Nov. 28.)

East Central

CHICAGO—Hump Hairpin Co., 1918 Prairie avenue, is preparing plans for a 2-story addition, 70 x 128 feet, to be erected in the spring.

CHICAGO—The machine shop and electrical department of the United Air Cleaners Corp., 9705 Cottage Grove avenue, was recently damaged by fire.

CHICAGO—Garden City Plating & Mfg. Co., 1430 South Talman street, has leased the second floor containing 23,000 square feet of floor space in a building at Ogden and Talman avenues, possibly for expansion purposes.

CRAWFORDSVILLE, IND.—Apex Stamping Co., care J. L. Rubel, is said to have plans for a proposed plant building on Elmore street. Architect has not been selected.

CRAWFORDSVILLE, IND.—Mid-States Steel & Wire Co., 510 Oak street, care E. J. Sommer, contemplates construction of a 1-story plant addition. Maturity is indefinite.

FT. WAYNE, IND.—General Electric Co., Schenectady, N. Y., awarded a contract to

M. Immscher & Sons, First National Bank building, Ft. Wayne, for the construction of a 6-story plant building here estimated to cost about $220,000.

MARION, IND.—Marion Craftsman Tool Co., Miller avenue, has started construction of a new plant building according to recent announcement.

NEWCASTLE, IND.—Chamber of commerce has completed negotiations with the Thomas Mfg. Co., manufacturer of heavy hardware and steel products, to establish a plant here. A new building will be constructed at once.

RICHMOND, IND.—Campbell Auto Sales, care R. Campbell, will take new bids next spring on the general contract for a proposed service garage and salesroom estimated to cost $80,000.

DETROIT—Detroit Hume Pipe Co., 500 South Main street, has purchased a 2-acre site adjacent to its present plant, on which it will later erect a plant building.

DETROIT—Michigan Tank & Galvanizing Co. plans to erect a plant next spring on a recently purchased tract, at Tireman avenue and Pere Marquette railroad.

DETROIT—University of Detroit has placed the general contract for an addition to its engineering building at Livernois and Florence avenues, with Corrick Bros. Malcomson & Higginbotham, are architects.

DETROIT—Bellevue Industrial Furnace Co., manufacturer of industrial furnaces, through C. L. Phelps, architect, 503 Detroit Savings Bank building, will soon take bids for the construction of a 1-story plant, 85 x 165 feet. The cost will probably be about $45,000.

DETROIT—Hubbell, Hartgering & Roth, Buhl building, are engineers for the construction of pumping stations at Nine Mile road and Jefferson avenue, at Eleven Mile road and Jefferson avenue, for this city. George J. Haas, 2231 Park, is architect.

DETROIT—Bids are being received for a 1-story steel mill building at Tireman avenue and Pere Marquette railroad to be erected for the Bopp Steel Corp., General Motors building. Christian W. Brandt, Francis Palms building, is architect.

LANSING, MICH.—Lansing Steel Corp., West Saginaw street, announces it will construct a plant for the designing, fabrication and erection of structural steel and ornamental iron. C. E. Brumm is president. Estimated cost will be $18,000.

PONTIAC, MICH.—Bids are being received for the construction of a power house at Pontiac Tuberculosis hospital. Frederick D. Madison, Washington Square building, Royal Oak, Mich., is architect.

CINCINNATI—Cincinnati Tool Co., 1951 Waverly avenue, advises it expects to construct a new forge shop next spring. Equipment will probably be needed. (Noted Dec. 19.)

CINCINNATI—Ford Motor Co., 660 Lincoln avenue, awarded a contract to the Weber Bell Construction Co. for plant alterations costing about $18,000.

CINCINNATI—Cincinnati Steel Castings Co., 1220 Queen avenue, awarded a contract for the construction of a 1-story foundry building, 90 x 290 feet, to D. Meinken & Son, 2143 Barnard avenue. (Noted Dec. 19.)

CINCINNATI—William Powell Co., 3233 Colerain avenue, manufacturer of brass and iron specialties, closed bids Dec. 10 for a 1-story and basement plant addition. (Noted Nov. 21.)

CLEVELAND — Cleveland Commercial Auto Body Co., 1717 East Forty-fifth street, will soon award a contract for a 1-story addition.

DEFIANCE, O.—Defiance Screw Machine Products Co. has plans for an equipment expansion program for increased production, according to Sidney Thompson, president.

TOLEDO, O.—Miller Pattern Co., recently incorporated by Marshall, Melhorn, Marlar & Martin, attorneys, Spitzer building, is said to have plans for building a plant at Sylvania avenue and Toledo Terminal railroad.

WESTERVILLE, O.—Bennett Mfg. Co., manufacturer of agricultural implements, whose plant was recently damaged by fire, advises it will rebuild and need following equipment: Motors, shafting and pulleys, belting, drill presses, table saw, hand woodworking tools, sanders, etc. (Noted Dec. 12.)

WHEELING, W. VA.—Center Foundry & Machine Co., Warwood avenue, has awarded a contract to the Wheeling Structural Steel Co. for the construction of a plant addition which will increase its floor space by about one-third. Estimated cost about $50,000.

KENOSHA, WIS.—The plant of the Wisconsin Oxygen & Hydrogen Co. was recently damaged by an explosion.

MILWAUKEE—Northwestern Fuel Co., subsidiary of the Consolidation Coal Co., 15 Broad street, New York, will build a coal handling dock here costing about $1,200,000 to be ready by June 1, 1930.

MILWAUKEE—Milwaukee Stamping Co., with plant in West Allis, has acquired the Litterer Bros. Mfg. Co., 3022 Rockwell avenue, Chicago, and is transferring the machinery to Milwaukee. For the present no new construction will be done, although it is in prospect later in 1930.

MILWAUKEE—Globe-Union Mfg. Co., 14-28 Keefe avenue, manufacturer of storage batteries, electrical and radio supplies, has awarded a contract for the construction of a 1-story addition, 150 x 320 feet, estimated to cost about $100,000.

MILWAUKEE—Lippmann Engineering Works, 432 Herman street, has started work on a new plant, 90 x 200 feet, at Forty-first avenue and Mitchell street, in West Milwaukee, to be equipped for the manufacture of sand and gravel washing plants and coal handling equipment. Bids are being taken on a 5 to 10-ton traveling crane. Motors have been purchased but orders for the principal machinery will not be placed until after Jan. 1.

RACINE, WIS.—Jacobsen Mfg. Co., power lawn mowers, which recently moved into a 4-story unit of the old Murray Body Corp. plant, is building a 2-story office and engineering addition costing about $40,000. R. F. Jacobsen is president and treasurer.

WAUKESHA, WIS.—Butler Bin Co., manufacturer of steel bins and gravity dumping devices for sand and gravel quarries, highway contractors, etc., is planning the expenditure of $40,000 in enlarging its capacity early next year.

WEST ALLIS, WIS.—J. F. Devine Pattern Mfg. Co., 5911 Greenfield avenue, has awarded contracts for the erection of a new shop, 45 x 100 feet, at 535 Fifty-sixth avenue.

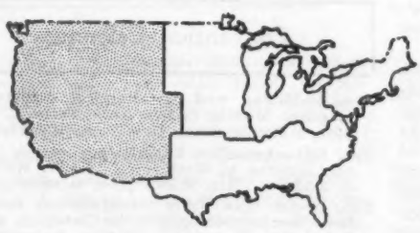
West Central

BLUE EARTH, MINN.—Minnesota Valley Canning Co., LeSueur, Minn., is having plans prepared for an addition, including a new power plant. R. W. Richardson, engineer, 116 East Fourth street, St. Paul.

ST. LOUIS—Ryan-Aircraft Corp., Lambert-St. Louis flying field, has plans for the construction of a plant addition for increased production. Estimated cost about $75,000. (Noted Aug. 15.)

KANSAS CITY, MO.—Missouri Pacific railroad, Thirteenth and Olive streets, St. Louis, is completing plans for the expenditure of approximately $750,000 on the construction of engine terminal shops here. E. A. Hadley, Railway Exchange building, St. Louis, is chief engineer.

ELGIN, NEBR.—Western States Utilities Co., subsidiary of the General Power & Light Co., 27 Williams street, New York, has purchased property here for construction of a proposed light plant.



Western States

LOS ANGELES—Los Angeles & Salt Lake railroad has let the contract for the erection of a one and 2-story brick and steel freight house, 70 x 558 feet, to the Lynch Construction Co. Estimated cost is $228,000.

SAN FRANCISCO—Kemper Radio Corp., 1659 Market street, has plans for an expansion program in connection with proposed manufacture of television sets, developed by Television Laboratories Inc.

COLORADO SPRINGS, COLO.—International Typographical Union home, care James McCoy, awarded a contract for the construction

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Machinery

Worcester, Mass., Interest Receives $1,000,000 Order for Papermaking Machines—Year-End Volume Dwindles—Shapers Up

MORE activity is noted in machinery markets in the East then elsewhere, although the market there is described as spotty. A Connecticut dealer last week closed on $40,000 worth of equipment, including lathes, milling machines and drills. Two papermaking machines were awarded by the Insull interests of Chicago, for installation in Maine. This business amounted to approximately $1,000,000. Several lines of shapers have been advanced 10 per cent, although in some instances dealers are giving until Jan. 30 to close at present prices. The first quarter list of Westinghouse Electric & Mfg. Co. has not made its appearance, most of the fourth quarter items having been placed. Deliveries are improved universally on most all standard machines.

New York, Dec. 24.—Several lines of shapers have been advanced 10 per cent effective Jan. 1, meeting an announced advance of another line several weeks ago. While buying has slipped off in December, the slump with several dealers and builders has been slight. Some report a moderate spurt this week. The market is well described as spotty. The total volume is below November, but with most sellers above December last year. Delivery on standard tools has improved materially and is near normal. Several builders now have lathes in stock.

Inquiries hold up well with indications that much of this business will be placed early in the year. Inquiries include an expansion by a steel fabricating shop, two shipyards, railroads, public utilities and railroad equipment shops. The aircraft engine and radio industries are out of the market. Metalworking plants are taking a few tools. Connecticut shops are rather active. One dealer, especially strong in that territory, closed on $40,000 worth of equipment in Connecticut one day last week, including lathes, milling machines and drills. The same interest has closed on 10 radial drills with New Jersey plants.

Considerable buying during the year drawing to a close has been for replacement. Inquiry for replacement holds brisk while buying for expansions during 1930 is expected to be as heavy as this year. Sales are generally confined to one or two units per order, but are well spread. A school in the Bronx is about to inquire for tools while the Holland Tunnel commission is in the market for a milling machine and lathe. Machine equipment plants are planning to increase schedules next month.

Crane inquiry is also more active. Shipyards, metalworking shops, foundries and railroads have pending business out. Crane business which has had a record-breaking year is expected to increase seasonally in January. Florandin Equipment Co. has closed on two 2-ton, underhung cranes for the S. S. Hepwerth Co., Long Island City plant, and a 5-ton underhung three-motor crane for the Walling Transportation Lines, Tottenville, Staten Island, N. Y.

Worcester, Mass., Dec. 24.—One of the largest single orders ever placed in Worcester was awarded this week to Rice, Barton & Fales Co. by the Insull interests of Chicago. It calls for two papermaking machines which will be installed in a new mill being erected on the Penobscot river in Maine. The contract price is near $1,000,000. Otherwise the machinery market is moving along without particular emphasis. In most lines orders are still scattered and business in general is spotty.

Pittsburgh, Dec. 24.—Machine tools are in a quiet market with closing on most important jobs deferred until after the first of the year. Inquiry also is light but there remains a fair volume of pending work. Westinghouse Electric & Mfg. Co. has closed on most of its fourth quarter list, but the list of its first quarter tools has not been issued as yet. Little equipment for railroads is pending with the exception of one small list for Baltimore & Ohio. Deliveries on tools have improved considerably during the past few months although deferred shipment still is in effect on drilling machines and horizontal boring mills.

Cleveland, Dec. 24.—The year is closing at ebb tide for machinery interests in this territory. Business is confined mostly to single units and December totals will be considerably lower than normal although one interest reports December volume equal to November due to the placing of one large list which had been hanging fire for some time. Inquiries, despite being good, have fallen off appreciably. Electric Auto-Lite Co. in Toledo, planning production of 7000 starters a day for Ford, has placed most of the equipment needed for its enlarged plant. No price increase in shapers has been reported in the Cleveland district. Automotive business continues quiet.

Chicago, Dec. 24.—Machine tool sales are running far behind a year ago, and are said to be the lowest since midsummer of last year. Inquiries are fairly numerous, however. A number of pending orders may be placed early next month. Orders from jobbing machine shops in the district are more scarce. Business from the western tractor works appears promising for next year. Monarch Tractor Co., Springfield, Ill., controlled by Allis-Chalmers Mfg. Co., Milwaukee, is building a plant addition, and will be in the market for equipment. Several lines of shapers are to be advanced 10 per cent in price, but dealers are given until Jan. 30 to close orders at present quotations. Deliveries from machine tool builders are much relieved.

Convention Calendar

Jan. 8—Mining and Metallurgical Society of America. Meeting in New York. Percy E. Barbour, 2 Rector street, New York, is secretary.

Jan. 9-11—American Engineering council. Annual meeting in Washington. L. W. Wallace, 26 Jackson Place, Washington, is secretary.

Feb. 4—American Boiler Manufacturers association. Semiannual meeting in Cleveland. A. C. Baker, 801 Rockefeller building, is secretary.

Feb. 7-8—American Society for Steel Treating Semiannual meeting at Hotel Pennsylvania, New York. W. H. Eisenman, 7016 Euclid avenue Cleveland, is secretary.

Feb. 17-22—American Ceramic society. Thirty-second annual convention at Royal York hotel, Toronto, Ont. Ross C. Purdy, 2525 North High street, Columbus, O., is secretary.

March 3-7—National Industrial exposition. At Hotel Stevens, Chicago. George Pfisterer, 308 West Randolph street, Chicago, is secretary.

Locomotive Sales Hold

Washington, Dec. 24.—November shipments of steam locomotives totaled 95, one less than in October. There were no shipments of electric locomotives, according to the department of commerce. Comparisons follow:

Year and Month	Shipments Total	Shipments Domestic Steam	Shipments Domestic Electric	Unfilled orders Total	Unfilled orders Domestic Steam	Unfilled orders Domestic Electric
Nov.	35	20	1	152	104	31
Total (11 mo.)	506	331	88	.....	.....	.....
Dec.	44	36	4	282	238	27
(1928)	550	367	92	.....	.....	.....
1929						
Jan.	23	6	6	278	251	21
Feb.	23	20	1	339	301	20
March	35	31	4	488	419	24
April	61	57	2	495	419	24
May	99	92	2	444	362	22
June	78	58	1	552	489	21
July	69	39	3	539	490	18
Aug.	129	117	6	436	392	13
Sept.	75	60	7	429	347	55
Oct.	96	90	6	423	347	49
Nov.	95	75	.....	398	340	49
Total (11 mo.)	783	645	38	.....	.....	.....

Court Orders Plant Sold

Petition of David A. Lillie, receiver for the Montpelier Foundry & Machine Co., Montpelier, Ind., for authority to sell its plant and close up the business of the company, has been granted by the circuit court at Hartford City, Ind.

Construction and Enterprise

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of a 3-story and basement heating plant, 47 x 72 feet.

BROWNING, MONT.—Glacier County Light & Power Co., care Frank Seal, has purchased property and plans to erect a power plant to cost about $125,000.

GREAT FALLS, MONT.—Great Northern railroad, St. Paul, has been issued a permit for the construction of a car repair shop and woodworking plant here to cost about $85,000.

SALT LAKE CITY, UTAH—University of Utah, care Thomas Hull, secretary, will close bids Dec. 27 for the construction of a hydraulic laboratory building addition, turbine, generator and auxiliary equipment. (Noted Oct. 10.)

SPOKANE—Waldo Lake Irrigation & Power Co., Spokane, has made application for a preliminary permit to construct two power houses and dig two canals in the Cascade national forest, Lane county, Oreg.

Southern States

BIRMINGHAM, ALA.—Southern Wheel Co., 700 Sixth street south, awarded a contract for the construction of a 1-story machine shop, 60 x 80 feet, to M. C. Banks & Co.

SHEFFIELD, ALA.—Kelly Axle & Tool Co., Charleston, W. Va., will build a plant on Twentieth street here to cost about $10,000. John Richardson is the local manager.

RUSSELLVILLE, ARK.—Chamber of commerce, care E. W. Hogan, president, has plans for the construction of an airport including hangars, shops, etc.

ATLANTA, GA.—Brooks Foundry Co., 515 Marietta street, awarded a contract for the construction of a 1-story foundry building, 30 x 40 feet, to the A. K. Adams & Co., 542 Plum street northwest.

MINDEN, LA.—Turner Bros. Lumber Co. has construction under way of a 40 x 106 foot machine shop on Gleason street.

ST. MARTINSVILLE, LA.—City voted $38,000 for improvements to municipal filtration and power plants.

PONCA CITY, OKLA.—City has plans for a hangar with repair facilities, 125 x 210 feet, estimated to cost about $65,000. E. O. Bennett, 1127 South Seventh street, is engineer.

WELEETKA, OKLA.—Public Service Co. of Oklahoma, Tulsa, Okla., proposes to build an addition to its power plant here.

CHATTANOOGA, TENN.—Chattanooga Stove & Foundry Co. will erect a modern stove and foundry building at East Lake, Tenn., to cost $200,000. J. E. Abshire, Chattanooga, Tenn., is president.

AUSTIN, TEX.—City, care A. R. Johnson, manager, awarded construction contract for three substations.

TORREON, MEXICO—Government engineers have completed a survey for the proposed dam to be constructed across the Nazas river here. A hydroelectric plant will be constructed in connection with the project which is estimated will entail an expenditure of approximately $6,000,000.

Canada

CALGARY, ALTA.—Anthes Foundry Co. has purchased a site of 6 acres here and will erect a new plant in the early future.

CALGARY, ALTA.—Dominion Car Wheel & Foundry Co. has purchased a site of 13 acres here and will start work early in the new year on the erection of a plant.

ST. BONIFACE, MAN.—Canadian National Railways contemplates building a rail salvaging plant on Mission street here. The general manager of the western region is A. A. Tisdale, Winnipeg, Man.

CHATHAM, ONT.—Weaver Canadian Co., manufacturer of automobile jacks, pumps, etc., proposes to start work next March on the erection of a plant addition on Richmond street here.

GEORGETOWN, ONT.—A syndicate of Toronto men has purchased the Georgetown Foundry & Machine Co., which will be operated as the Credit Valley Foundry Co. Officials expect to start operations in the early future. An electric furnace will be installed.

HAMILTON, ONT.—Canadian National Railways, Montreal, Que., has plans for the construction of a machine shop, reclamation yards and rail cutting plant here.

OSHAWA, ONT.—Bids are being received, no closing date set, by C. H. R. Fuller, Centre street school, for the supply of machine shop equipment, including tools, lathes, etc., for the board of education.

PETERBOROUGH, ONT.—Martin-Hewett Container Co. Ltd. has awarded contract to Thomas P. Ephgrave, 310 London street, for the erection of a plant addition to cost $50,000. Herbert Martin, 8 Lytton boulevard, Toronto, Ont., is interested.

PETERBOROUGH, ONT.—A. Wander Ltd., 455 King street west, Toronto, Ont., has awarded contract to T. A. Brown Co. Ltd., Wolfe street, Peterborough, for the erection of a manufacturing plant at Lansdowne and Park streets here to cost $50,000. Chapman & Oxley, 372 Bay street, Toronto, are architects.

SANDWICH, ONT.—Sandwich Foundry Ltd. will start rebuilding at once a portion of plant recently damaged by fire. Estimated loss is $250,000.

ST. CATHARINES, ONT.—Packard Electric Co. Ltd., Race street, proposes to build a motor plant on St. Paul street west, in the near future. F. T. Garner is secretary and treasurer. Architect not yet appointed.

TORONTO, ONT.—Neptune Meter Co. Ltd., 345 Sorauren avenue has awarded a number of contracts in connection with plant addition here.

TORONTO, ONT.—Aluminum Co. of Canada Ltd., 158 Sterling road, has awarded a number of contracts in connection with the erection of a $50,000 plant addition here.

TORONTO, ONT.—Coady Bros., 1405 Bloor street west, manufacturers of motor truck bodies, have purchased the greater portion of the old Bigley foundry property on Wabash avenue, possibly for expansion purposes.

TONONTO, ONT.—C. E. Cansfield Electric Co., 260 Geary avenue, has let contract to J. D. Young & Apperley, 428 Ossington avenue, for the erection of an addition to its plant to cost $10,000. Construction work to be started immediately.

CAP DE LA MADELEINE, QUE.—United Mfg. Co. has awarded contracts in connection with manufacturing plant to be erected here at a cost of $85,000. The Charles Page Construction Co., Three Rivers, Que., has the general contract. Philip Fainer, 1470 Peel street, Montreal, Que., is president.

Recent Incorporations

PENSACOLA, FLA.—Pensacola Metal Aircraft Corp. has been incorporated to manufacture a special type of seaplane. Paul L. Pierce is secretary and treasurer.

CHICAGO—Associated Industries Inc., 100 West Monroe street, has been incorporated to manufacture and deal in radios, radio products and devices, by H. Smith.

CHICAGO—Chicago Metal Products Inc., Suite 1209, 111 West Washington street, has been incorporated with 600 shares of no par stock to deal in metal products of all kinds, by Victor Arkin.

MOLINE, ILL.—D. J. Ryan Construction & Improvement Co., Peoples Bank building, has been incorporated with $201,500 preferred and $98,500 of common stock to engage in contracting business, architect and engineering.

BOSTON—International Equipment Co., 352 Western avenue, has been incorporated with $140,000 preferred and 14,000 shares of common stock to manufacture laboratory equipment. Arthur Kendrick is president.

BOSTON—Hydraulic Development Corp., 296 Boylston street, has been incorporated with 1000 shares of no par stock to construct water systems, deal in supplies and equipment. Frank

L. Northrop, 10 Park Vale avenue, is president.

BOSTON—American Salvage Corp. has been incorporated with $5000 capital to trade in scrap iron, salvage materials, etc. Philip Broomfield, 138 Fuller street, Brookline, Mass., is president and treasurer.

BOSTON—A. L. White & Co. Inc. has been incorporated with 250 shares of no par stock to maufacture lighting fixtures and electrical appliances. Albion L. White, 10 Fairbanks street, Brookline, Mass., is president.

PEABODY, MASS.—McCarthy & Co. Inc. has been incorporated with $10,000 capital to manufacture, import and deal in heating apparatus, radiators, valves and supplies, etc. Thomas J. McCarthy, 11 Margin street, is president.

DETROIT—Service Electric Co. has been incorporated with $10,000 capital to repair, rent, sell and equip electric motors and apparatus, by Elton S. Miller, 950 Reed place.

DETROIT—Berkeley Tool & Mfg. Co., Berkley, has been incorporated with $50,000 capital to manufacture and deal in production parts, tools and dies, by C. E. Barth, 454 West Oakridge, Ferndale, Mich.

DETROIT—American Art Metal Works Inc. has been incorporated with $50,000 capital, to manufacture and deal in die castings, tools and metal automobile hardware, by John Hartman, 5036 Twenty-third street.

DETROIT—Anderson & Haney Co. has been incorporated to engage in general contracting and building business in Detroit and Dearborn, Mich., with $25,000 capital, by Oscar G. Haney, 9236 Cheyenne avenue.

PALMYRA, MICH.—Fred C. Ehinger Mfg. Co. has been incorporated with $50,000 capital to manufacture and sell wood products, by Fred C. Ehinger.

HARRISON, N. J.—Hudson Foundry Co. Inc. has been incorporated with 1000 shares of common stock to operate a foundry, by James A. Lynch Jr., attorney, 9 Clinton street, Newark, N. J.

JERSEY CITY, N. J.—Peerless Insulated Wire Cable Co. has been incorporated to manufacture wire, by the Corporation Trust Co., 15 Exchange place, Jersey City, N. J.

MORRISTOWN, N. J.—Bozzi Construction Co. has been incorporated with $100,000 capital to engage in contracting business, by Rosinger, Mayer & Albano, attorneys, 31 Clinton street, Newark, N. J.

NEWARK, N. J.—Ideal Mfg. Co. has been incorporated with 2500 shares of common stock to engage in the manufacture of oil heaters, by Levy, Fenster & McCloskey, 45 Branford place.

NEWARK, N. J.—Radio King Tube Corp. has been incorporated with 500 shares of common stock to manufacture radio tubes, by Theodore D. Gottlieb, attorney, 31 Clinton street, Newark.

PLAINFIELD, N. J.—Powerite Mfg. Co. Inc. has been incorporated with 2500 shares of common stock, to manufacture powerite compounds, by Kunzman & Kunzman, Plainfield, N. J.

BROOKLYN, N. Y.—Industrial Plating & Finishing Corp. has been incorporated with $50,000 capital, by T. M. Hill, 2 Rector street, New York.

NEW YORK—Allied Bronze & Ornamental Iron Corp. has been incorporated with 2000 shares of common stock, by S. B. Pollak, 570 Seventh street.

NEW YORK—Paparella Modern Art Iron Works has been incorporated with $10,000 capital, by J. H. Marino, 110 East Forty-second street.

ROCHESTER, N. Y.—Remjor Excavation & Construction Corp. has been incorporated with 2000 shares of common stock, by E. C. Redfern, attorney, Union Trust building.

CLEVELAND—Shields Furnace Carburetor Co., 1725 Doan avenue, has been incorporated with 250 shares of no par stock to manufacture and sell furnace carburetors, by Carl Shields.

CLEVELAND—Circo Products Co. of Cleveland, has been incorporated with 1000 shares of no par stock to manufacture oil compounds and later may manufacture and deal in automobile parts, equipment and accessories, by Niman & Buss, attorneys, Guarantee Title building.

SANDUSKY, O.—Centrifugal Steel Inc. has been incorporated with $50,000 capital, by Squires, Sanders & Dempsey, attorneys, Union Trust building, Cleveland.

WARREN, O.—Peerless Electric Co. has been incorporated with $350,000 and 42,000 shares of no par stock, by Fillius & Fillius, attorneys, Second National Bank building.

PHILADELPHIA—Philadelphia Range Boiler & Steel Tank Co. has been incorporated with $50,000 capital to manufacture and deal in boilers and tanks, etc. Albert E. Rems, 251 West Wyoming avenue, is treasurer.

DALLAS, TEX.—Atlas Metal Works has been incorporated with $50,000 capital, by Boude Storey, 2601 Alamo street.

DALLAS, TEX.—Perfection Ice Scoring Machine Co. has been incorporated with $4500 capital, by R. H. Giles, Waco, Tex.

INGERSOLL, ONT.—John Morrow Screw & Nut Co. Ltd. has been incorporated to manufacture with a capital of $1,000,000 and 150,000 shares of no par stock. William K. Fraser, 63 Main street, Toronto, Ont., is one of the directors.

LONDON, ONT.—Webster Cameron Ltd. has been incorporated to manufacture and deal in metal hardening process with $40,000 stock, by John Cameron and Hugh G. Webster.

LONDON, ONT.—W. H. Appleby Co. Ltd. has been incorporated to manufacture and deal in airplanes and pacer cars with $40,000 stock, by John H. Appleby, John Harvey and Charles S. Wilson, all of London.

TORONTO, ONT.—W. W. Wells Ltd. has been incorporated to manufacture and deal in machinery and electrical supplies with 8000 shares of no par stock, by John R. Robinson, 63 Wellesley street, Toronto.

MONTREAL, QUE.—Webb Jay Products Ltd. has been incorporated to manufacture and deal in automobiles, trucks, tractors and farm implements with 30,000 shares of no par stock, by Gerald H. Phillimore, 240 St. James street, Montreal.

MONTREAL, QUE.—Silent Glow Oil Burner Corp. Ltd. has been incorporated to manufacture and deal in oil burners, oil burner devices and apparatus with $50,000 capital, by William H. Wilson, Howard K. Hawthorne and Cedric Hands, all of Montreal.

New Trade Publications

AIRPLANE FORGINGS—National Machinery Co., Tiffin, O., has issued a leaflet calling attention to the special forgings it is producing for airplane service.

ENGINEERING GRAPHIC — Sullivan Machinery Co., Chicago, has started publication of a periodical under the title *Engineering Graphic*, replacing *Mine and Quarry*, which has been published for several years. It will cover a wider field than the former publication.

POLISHING AND PLATING EQUIPMENT—Hanson-Van Winkle-Munning Co., Matawan, N. J., is distributing a new catalog of its polishing and plating equipment and supplies. It is illustrated and contains much information for users of these materials and supplies.

STEAM—High pressure steam in the paper industry is the theme of a reprint of a paper by J. B. Crane of the Combustion Engineering Corp., New York, which is being distributed by that company. The principles discussed in this paper apply equally to other than the paper industry, in the use of steam for power and processing. The economic possibilities of high-pressure steam in industrial plants are given consideration.

PICKLING—A neat booklet on the subject of pickling of metal articles to remove scale and improve the surface has been prepared by the Chemical Products Co., North Chicago, Ill. The entire subject is covered in tabloid and the booklet constitutes a manual on this process.

CHAIN HOISTS AND TROLLEYS—A catalog of its chain hoists and trolleys has been issued by the Ford Chain Block Co., Philadelphia. Tables show hoisting speeds and dimensions and illustrations cover the hoists and their details. Varied uses in industry also are illustrated.

COPPER AND BRASS — Revere Copper & Brass Inc., Rome, N. Y., is circulating illuminated copies of its advertising from magazines. In the effort to burn the Revere name deeply it is presenting a series of historical statements, illustrated with copies of old cuts of the time of Paul Revere & Son, direct ancestor of the present company.

PULVERIZED COAL—An interesting account of the discovery of coal and its value as fuel is contained in a leaflet by the Kennedy-Van-Saun Mfg. & Eng. Corp., New York. Old-time illustrations embellish the text. The use of powdered coal to produce heat and power, through equipment manufactured by this company, is emphasized.

OUTDOOR SWITCHHOUSE — Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., illustrates in a current bulletin its type of outdoor switchhouses. It covers the application, distinctive features, construction and advantages of this equipment, with manual, motor or solenoid-operated oil circuit breakers. Specifications are listed for three types with description of automatic reclosing equipment available for all electrically operated breaker equipments and all feeder circuits. Outline dimensions and drawings of various types of switchhouses are given.

DETROIT STEEL SERVICE

Mr. Thomas H. Booth, Vice President and his Detroit Ward-house staff have provided outstanding service facilities for this great automotive district.

EDGAR T. WARD'S SONS CO.

(Division of COLUMBIA STEEL & SHAFTING CO.)

DETROIT WARD-HOUSE—1300 Fort St., West

BOSTON, 44 Farnsworth St.
BUFFALO, 39 River St.
CHICAGO, 1455 W. 37th St.
CLEVELAND, 1210 E. 55th St.
MILWAUKEE, 57 Ave. and Burnham St.
NEWARK, 400 Frelinghuysen Ave.
NEW YORK, 373 Pearl St.
PHILADELPHIA, Cedar and Westmoreland Streets

The World's Largest Distributors of Fine Steel Products

Pipe and Tube Prices—Plate Extras

Steel Pipe

Pittsburgh and Lorain basing discounts, jobber's carloads.

Evanston, Ill., and Indiana Harbor, Ind., take differential 2 points less discount.

Chicago takes differential 2½ points less than Pittsburgh-Lorain basis.

Butt Weld

	Black	Galvanized
⅛-inch	45	19½
¼ and ⅜-inch	51	25½
½-inch	56	42½
¾-inch	60	48½
1 to 3-inch	62	50½

Lap Weld

2-inch	55	43½
2½ to 6-inch	59	47½
7 to 8-inch	56	43½
9 and 10-inch	54	41½
11 and 12-inch	53	40½

REAMED AND DRIFTED

Butt Weld

1 to 3-inch	60	48½

Lap Weld

2-inch	53	41½
2½ to 6-inch	57	45½

EXTRA STRONG—PLAIN ENDS

Butt Weld

⅛-inch	41	24½
¼ and ⅜-inch	47	30½
½-inch	53	42½
¾-inch	58	47½
1 to 1½-inch	60	49½
2 to 3-inch	61	50½

Lap Weld

2-inch	53	42½
2½ to 4-inch	57	46½
4½ to 6-inch	56	45½
7 to 8-inch	52	39½
9 and 10-inch	45	32½
11 and 12-inch	44	31½

DOUBLE EXTRA STRONG

Butt Weld

½-inch	42	32½
¾ to 1½-inch	45	35½
2 to 2½-inch	47	37½

To jobbers these discounts are increased by 1 point and two supplementary discounts of 5 per cent on black, and 1½ points and two supplementary discounts of 5 per cent on galvanized.

Wrought Iron Pipe

Pittsburgh basing discounts, jobbers' carloads. Individual quotations made on delivered basis.

THREADS AND COUPLINGS

Butt Weld

	Black.	Galv.
⅛ and ¼-inch	+11	+36
⅜-inch	23	5
½-inch	28	11
¾-inch	31	15
1½ and 2-inch	35	18

Lap Weld

1¼ and 1½-inch	Upon application	
2-inch	23	9
2½ to 3½-inch	28	12
4 to 6-inch	30	17
7 and 8-inch	29	16
9 to 12-inch	26	11

REAMED AND DRIFTED

2-inch to 6-inch—Two points less than above

EXTRA STRONG, PLAIN ENDS

⅛ and ¼-inch	+13	+48
⅜-inch	23	7
½-inch	28	12
¾-inch	34	18

Lap Weld

2-inch	29	13
2½ to 4-inch	34	20
4½ to 6-inch	33	19
7 and 8-inch	31	17
9 to 12-inch	21	8

DOUBLE EXTRA STRONG

Butt Weld

½-inch	+47½	+59½
¾-inch	+28	+40
1-inch	+34	+46
1¼-inch	+28	+40
1½-inch	+27	+39

Lap Weld

2 and 2½-inch	+13	+25
3 to 4-inch	+ 8	+17
4½ to 6-inch	+ 9	+18
8-inch	+12	.....

Jobbers obtain additional preferential discounts of 1, 5 and 2½ on black and galvanized wrought iron pipe.

On extra or double extra strong pipe fitted with threads and couplings basing discount lowered 5 points from plain end price. Fitted with threads only, basing discount lowered 3 points for random lengths.

Boiler Tubes

Pittsburgh carload discounts

STEEL (Lap Weld)

2 and 2¼-inch	38 off
2½ and 2¾-inch	46 off
3-inch	52 off
3¼ to 3⅝-inch	54 off
4-inch	57 off
4½ to 6-inch	46 off

Subject to two 5 per cent discounts on full carload shipments. On less than 10,000 pounds, base discount reduced 6 points and one 5 per cent allowed. Over 10,000 pounds to carload, base discount reduced 4 points and two 5 per cents allowed.

CHARCOAL IRON

1½-inch	1 off
1¾-inch	8 off
2 and 2¼-inch	13 off
2½ and 2¾-inch	16 off
3-inch	17 off
3¼ to 3½-inch	18 off
4-inch	20 off
4½-inch	21 off

Subject to 10 per cent discount on full carload lots. On less than 10,000 pounds, base discount reduced 2 points and no preferential allowed. On 10,000 pounds to carload, 5 per cent preferential allowed.

SEAMLESS COLD DRAWN

1-inch	61 off
1¼ and 1½-inch	53 off
1¾-inch	37 off
2 and 2¼-inch	32 off
2½ and 2¾-inch	40 off
3-inch	46 off
3¼ and 3½-inch	48 off
4-inch	51 off
4½, 5 and 6-inch	40 off

SEAMLESS HOT ROLLED

1¾-inch	37 off
2 and 2¼-inch	38 off
2½ and 2¾-inch	46 off
3-inch	52 off
3¼ and 3½-inch	54 off
4-inch	57 off
4½, 5 and 6-inch	46 off

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed.

SEAMLESS STEEL MERCHANT BOILER TUBES

Extras:

Add 5 per cent for lengths over 24 feet and not over 26 feet.

Smaller tubes than 1-inch and lighter than standard gage to be sold at mechanical tubing list and discount.

Intermediate sizes and gages not listed above take price of next larger outside diameter and heavier gage.

SEAMLESS STEEL MECHANICAL TUBING

Base Discounts on New List July 1, 1925

Carbon 0.10 to 0.30 per cent.....50 to 55 off

Carbon 0.30 to 0.40 per cent.....45 to 50 off

Plus usual extras for forming and for long lengths over 18 feet and for commercially exact lengths.

SEAMLESS STEEL LOCOMOTIVE AND SUPERHEATER TUBES

Outside diameter	Gage	Net prices per foot f.o.b. Pittsburgh Price
2-inch	12-gage	14¼c
2-inch	11-gage	15c
2-inch	10-gage	16c
2¼-inch	12-gage	16c
2¼-inch	11-gage	17c
2¼-inch	10-gage	18c
3-inch	7-gage	38c
5⅜-inch	9-gage	50c
6½-inch	9-gage	52c

Plus usual extras for forming and for lengths over 24 feet.

Plate Extras

BASE

Rectangular plates, tank steel or conforming to manufacturers' Standard Specifications for structural steel, date Nov. 24, 1922, or equivalent, ¼-inch thick and over on thinnest edge (except for ¼-inch or 72 inches wide when ordered to weight in pounds per square foot—see width and gage extras), 100 inches wide and under, down to but not including 6 inches wide, 5 feet 0 inches long up to published limit in length but not over 80 feet 0 inch, are base. Extras per pound for width or diameter.

All Plates Rectangular or Otherwise

¼-inch thick and heavier, but not less than 11 pounds per square foot, if ordered to weight.

Over 100 to and including 110 inches	.05c
Over 110 to and including 115 inches	.10c
Over 115 to and including 120 inches	.15c
Over 120 to and including 125 inches	.25c
Over 125 to and including 128 inches	.50c

Plates less than ¼-inch or lighter than 11 pounds per square foot.

Over 72 to and including 84 inches	.10c
Over 84 to and including 96 inches	.20c
Over 96 to and including 100 inches	.30c

Over 100 inches add .35c to width extras for plates ¼-inch thick and heavier.

GAGE

Plates Not Exceeding 72 Inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{16}$-inch; or lighter than 10.2 pounds per square foot, to and including 7.65 pounds square foot..... .20c

Plates Over 72 Inches Wide

Plates less than ¼-inch gage, to and including $\frac{7}{16}$-inch; or lighter than 11 pounds per square foot, to but not including 7.65 pounds square foot.... .20c

Plates ordered 7.65 pounds square foot .30c

QUALITIES

Pressing steel	.10c
Flange steel (boiler grade)	.15c
Ordinary firebox steel	.20c
Stillbottom steel	.30c
Locomotive firebox steel	.50c
Marine steel	1.50c
Hull materials subject to U. S. Navy Dept. specifications for medium or soft steel	.10c
High tensile hull steel subject to U. S. navy department or equivalent specifications	1.00c
Boiler steel subject to U. S. navy department specifications, classes A-B	1.50c
Hull plates to hull specifications, required to stand cold flanging, take extra for flange steel.	

Floor Plates

Checkered plates 1.75c

Checkered plates are not furnished to sketch and are rolled from "Stock Steel" only. No physical tests will be made on checkered plates.

INSPECTION

Mill inspection .....No extra

Charges for other inspection, such as Lloyd's or American bureau of shipping, will be made by inspection bureau direct to buyer.

CUTTING

LENGTH OR DIAMETER

All Plates, Rectangular or Otherwise

Five feet and over up to published limit of length, but not over 80 feet	No extra
Under 5 feet to 3 feet inclusive	.10c
Under 3 feet to 2 feet inclusive	.25c
Under 2 feet to 1 foot inclusive	.50c
Under 1 foot	1.55c
Over 80 feet to 100 feet inclusive	.10c

Over 100 feet add .25c plus .05c for every additional 2 feet or fraction thereof.

Regular Sketches

With not more than four straight cuts. (Including straight taper plates)

Additional extra ..... .10c

Irregular Sketches

With not more than four straight cuts. (Sketches cannot be sheared with re-entrant angles)

Additional extra ..... .20c

Model 24-P ejection type press, having box 100" long, 20" wide, 42" deep. Finished bales measure 20" x 14" x 14" minimum. Can be equipped with power operated loading hopper.

LOGEMANN SCRAP METAL PRESSES

Hydraulically compressed scrap commands at all times the *best price,* and can be conveniently stored and held for favorable markets; it is easily handled; it practically eliminates corrosion; it saves much time in remelting; cars can be easily loaded to capacity.

***LOGEMANN Presses* are built in several types and sizes to suit all requirements.**

You cannot go wrong on a LOGEMANN—it's a money maker from the day it is set in operation.

PIONEERS!

LOGEMANN Scrap Metal Presses, pioneers in this industry, enjoy an enviable reputation for long life and economical operation. They are in daily use in practically every large sheet mill, stamping plant, scrap yard, and in metal-working establishments of all kinds.

Our many years of accumulated experience, and services of our Engineering Department are at the disposal of all plants accumulating metal scrap of any kind.

LOGEMANN BROTHERS COMPANY, 3126 Burleigh St., MILWAUKEE, WIS.

THE HUESSENER COMBUSTION SYSTEM

FOR

OPEN HEARTH FURNACES

IS NOW PRODUCING THESE RESULTS

1. Substantial savings in fuel that will pay for the cost of the installation in one year or less.

2. Real savings in brick work, both in repairs, and in longer furnace life.

3. Increased production, due to shortening the melt-down period.

4. Greater Uniformity in quality of steel due to control of furnace atmosphere.

ALL FURNACES WILL EVENTUALLY HAVE AUTOMATIC COMBUSTION CONTROL

For Particulars Write to

AMERICAN HEAT ECONOMY BUREAU, INC.

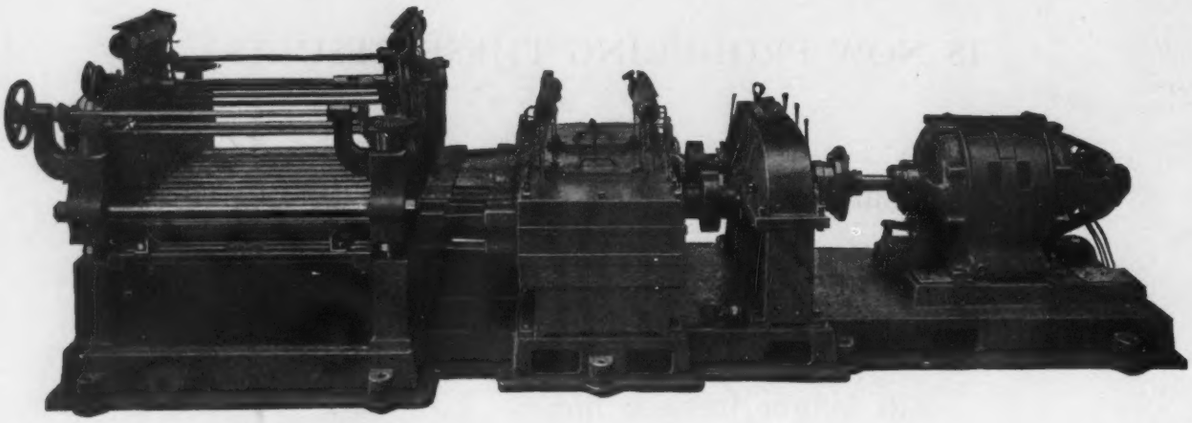
Builders of The *STEINBART BURNER*

English Address:
International Heat Economy Bureau, Ltd.,
Brook House, Walbrook, London, E. C. 4, England

926-930 Wabash Building
Pittsburgh - Pennsylvania

Sutton No. 2-B 60" Patented SHEET FLATTENER

The only machine that will straighten sheets from end to end and eliminate crosswise dish or bow



Motor shown on this cut is a temporary set-up

An entirely new principle of flattening sheets, which produces results never before obtained.

Sheets passing through this machine are absolutely flat *both lengthwise and crosswise.*

There is also a marked reduction of *"Stretcher Strains"* in deep drawn sheets due to the more thorough working the sheets get in this leveler.

Machines are equipped with high carbon forged or hardened and ground steel rolls.

Independent adjustment of rolls in patented feature eliminate dish.

Additional independent adjustment of rolls controls deflection of sheet at needed points.

In cut shown above, gears in primary drive are steel cut herringbone. Gears in flexible spindle drive are high grade heat treated tool steel herringbone cut integral with shaft. All gears enclosed in oil tight housings.

Worm and worm wheel drive may be substituted for tool steel herringbone gear drive at a considerable reduction in price.

All drive connections are made by means of Flexible Couplings.

Lunkenheimer Sight Feed gravity lubricators or centralized grease lubrication furnished.

Bulletins sent on request.

SUTTON ENGINEERING CO.

PARK BUILDING PITTSBURGH, PA.

The men in the Bethlehem Alloy Steel Plant have had many years of experience. You are justified in placing implicit confidence in the steels they turn out. To these men the making of fine alloy steels is second nature.

Your ALLOY STEEL PROBLEMS are ours

ALMOST entirely in the automotive industry and to a large and increasing extent in other industries, alloy steels are being used in vital parts; parts that must not fail. The burden of responsibility for the performance of these parts devolves upon the makers of the alloy steels that go into them.

Since engineers first turned to alloy steels in their search for materials having higher physical properties, Bethlehem Metallurgists have made the problems of alloy steel users their own. And now, though the almost unvarying dependability of alloy steel parts makes it seem that the ultimate in quality is being approached, the men who make Bethlehem Alloy Steels are constantly striving to turn out an even better product.

BETHLEHEM STEEL COMPANY

General Offices: Bethlehem, Pa.

District Offices: New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Detroit, Cincinnati, Chicago, St. Louis, San Francisco, Los Angeles, Seattle, Portland, and Honolulu.

Bethlehem Steel Export Corporation, 25 Broadway, New York City
Sole Exporter of our Commercial Products

BETHLEHEM ALLOY STEELS

Look for this brand—

KEYSTONE COPPER STEEL
AMERICAN
SHEET AND TIN PLATE COMPANY
PITTSBURGH
TRADE MARK REG. U.S. PAT. OFF.

The Original COPPER STEEL

Blue Annealed, Black and Galvanized Sheets
Formed Roofing and Siding Products
Culvert and Flume Stock
Vault and Tank Stock
Roofing Terne Plates

Send for copy of "Anti-Corrosive Metal" booklet

First introduced in 1911—and since that time the tonnage of our various sheets of

KEYSTONE QUALITY

has grown from 5,000 to upwards of 300,000 tons annually, because of the ability of KEYSTONE to resist rust and give longer service.

KEYSTONE Copper Steel Sheets excel for car roofing and new car construction. The United States Reclamation, Forestry, and Public Roads Departments use KEYSTONE for culverts and flumes. Specify it for roofing, siding, spouting, gutters, metal lath, and exposed sheet metal work.

AMERICAN
Steel Sheets for Every Purpose

American Sheet and Tin Plate Company
General Offices: Frick Building, Pittsburgh, Pa.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES:

AMERICAN BRIDGE COMPANY
AMERICAN SHEET AND TIN PLATE COMPANY
AMERICAN STEEL AND WIRE COMPANY
CARNEGIE STEEL COMPANY
CYCLONE FENCE COMPANY
FEDERAL SHIPBUILDING AND DRY DOCK COMPANY
ILLINOIS STEEL COMPANY
MINNESOTA STEEL COMPANY
NATIONAL TUBE COMPANY
THE LORAIN STEEL COMPANY
TENNESSEE COAL, IRON & R. R. COMPANY
UNIVERSAL PORTLAND CEMENT COMPANY

Pacific Coast Distributors—United States Steel Products Company, San Francisco, Los Angeles, Portland, Seattle, Honolulu. *Export Distributors*—United States Steel Products Company, New York City

YEARS of experience and extensive research enable us to manufacture highest quality Galvanized Sheets for all purposes to which zinc coated sheets are suitable.

AMERICAN

APOLLO Best Bloom *and* KEYSTONE Copper Steel

Galvanized Sheets

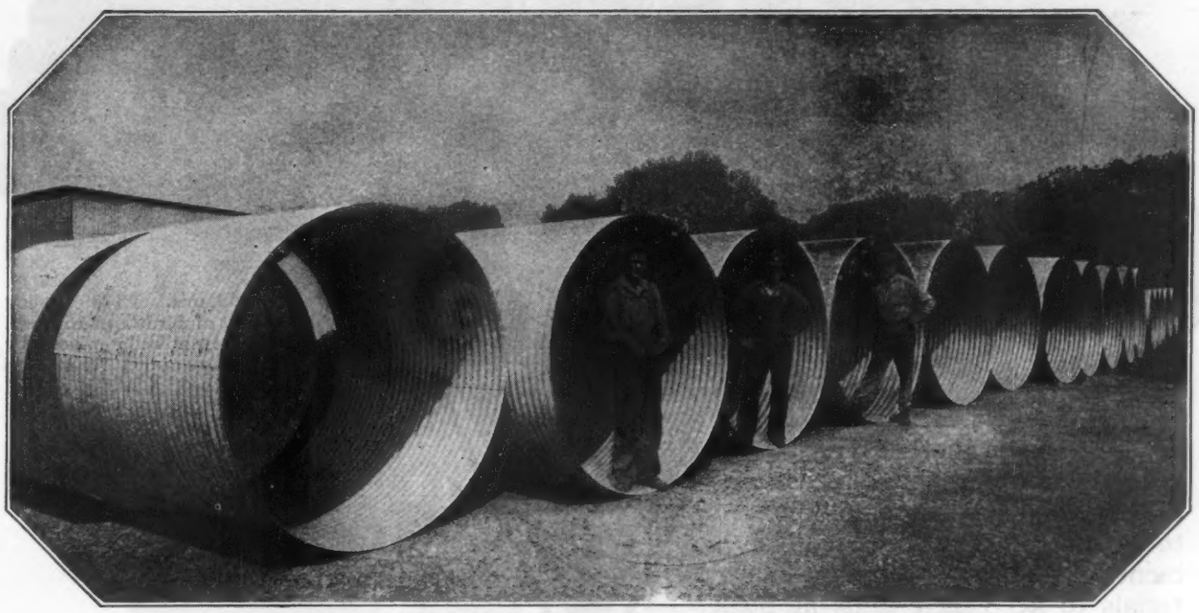


Illustration showing KEYSTONE Copper Steel Corrugated Galvanized Culvert Stock for Drainage Pipe of United Verde Extension Mines, and also for Culverts in Roosevelt Irrigation Project, Arizona.

APOLLO BEST BLOOM GALVANIZED has been the leader since 1884, and is well known for its ductility, its splendid coating, and general excellence. Apollo Galvanized binds together more satisfied sheet metal workers than any other make.

KEYSTONE COPPER STEEL GALVANIZED embodies all the high qualities of the Apollo brand, together with a copper steel alloy base which gives *added resistance to rust.* KEYSTONE quality insures the maximum degree of wear and permanence.

American Sheet and Tin Plate Company

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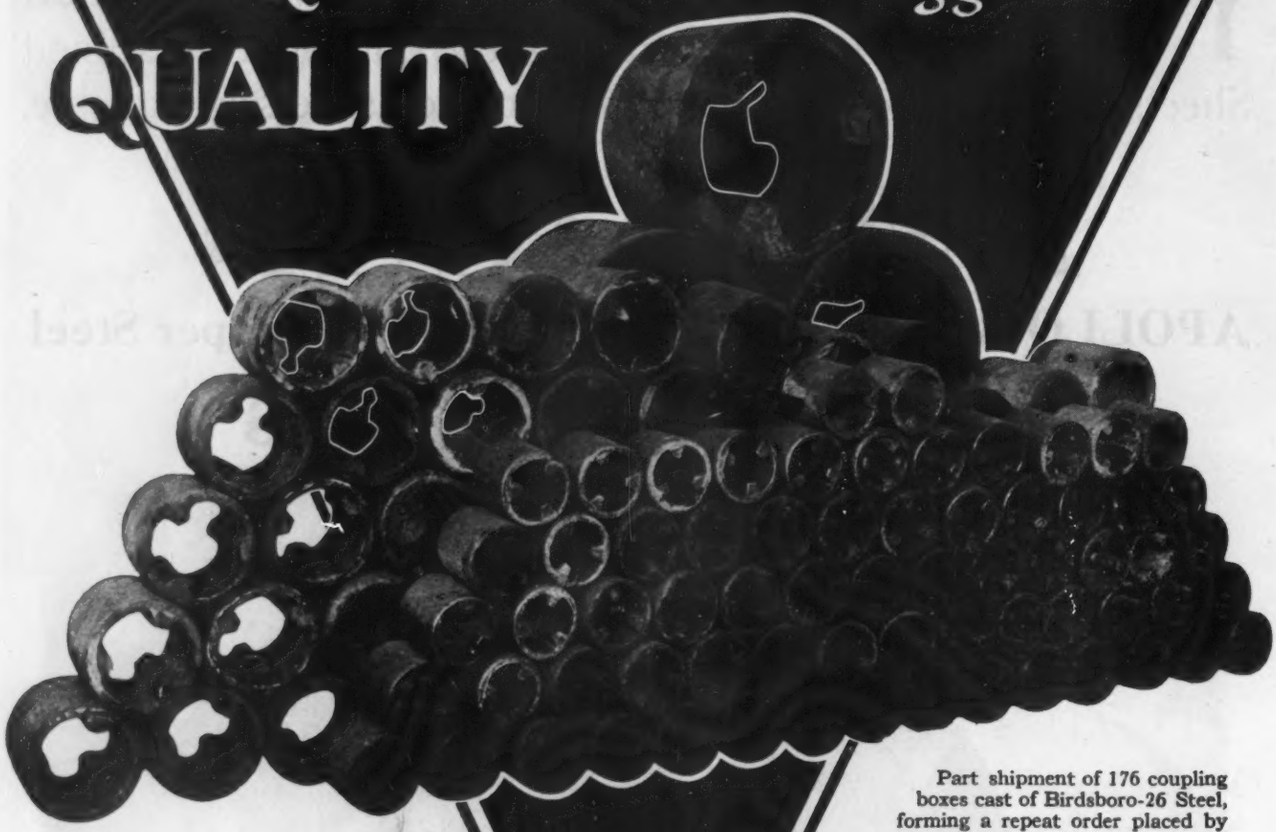
UNIVERSAL PORTLAND CEMENT COMPANY

Pacific Coast Distributors—United States Steel Products Company, San Francisco, Los Angeles, Portland, Seattle, Honolulu. *Export Distributors*—United States Steel Products Company, New York City

Where QUANTITY *suggests* QUALITY



Part shipment of 176 coupling boxes cast of Birdsboro-26 Steel, forming a repeat order placed by a prominent manufacturer of steel products.

AGAIN! Birdsboro ships another repeat order of coupling boxes, cast of that good Birdsboro-26 Steel, to a customer whose requirements command the best of materials to keep their mills at peak production. . . An example of *quantity* suggesting *quality*.

The coupling box is but one of many castings subject to great stress that come to Birdsboro in *repeat order* form. From the small locomotive crosshead to the huge pump case on the hydraulic dredge—repetition carries on . . . each casting seeking new channels of endurance.

Whether it be one casting or a thousand, carbon or alloy, a trial order placed with Birdsboro will convince.

BIRDSBORO
STEEL FOUNDRY AND MACHINE COMPANY
DESIGNERS AND BUILDERS
BIRDSBORO, PENNSYLVANIA

New York—90 West St. Chicago—208 So. La Salle St.
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RODS, BOLTS
AND NUTS FOR
HEAVY DUTY
We produce forged nuts and rods, upset or plain, in sizes up to 8" in diameter—in either standard or special shapes.
Our facilities are such that we can offer exceptional service and rapid delivery on practically all classes of this type of work.
PITTSBURGH SCREW AND BOLT CORP.
PITTSBURGH
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Plants:
Continental Works, Chicago
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Sales Offices:
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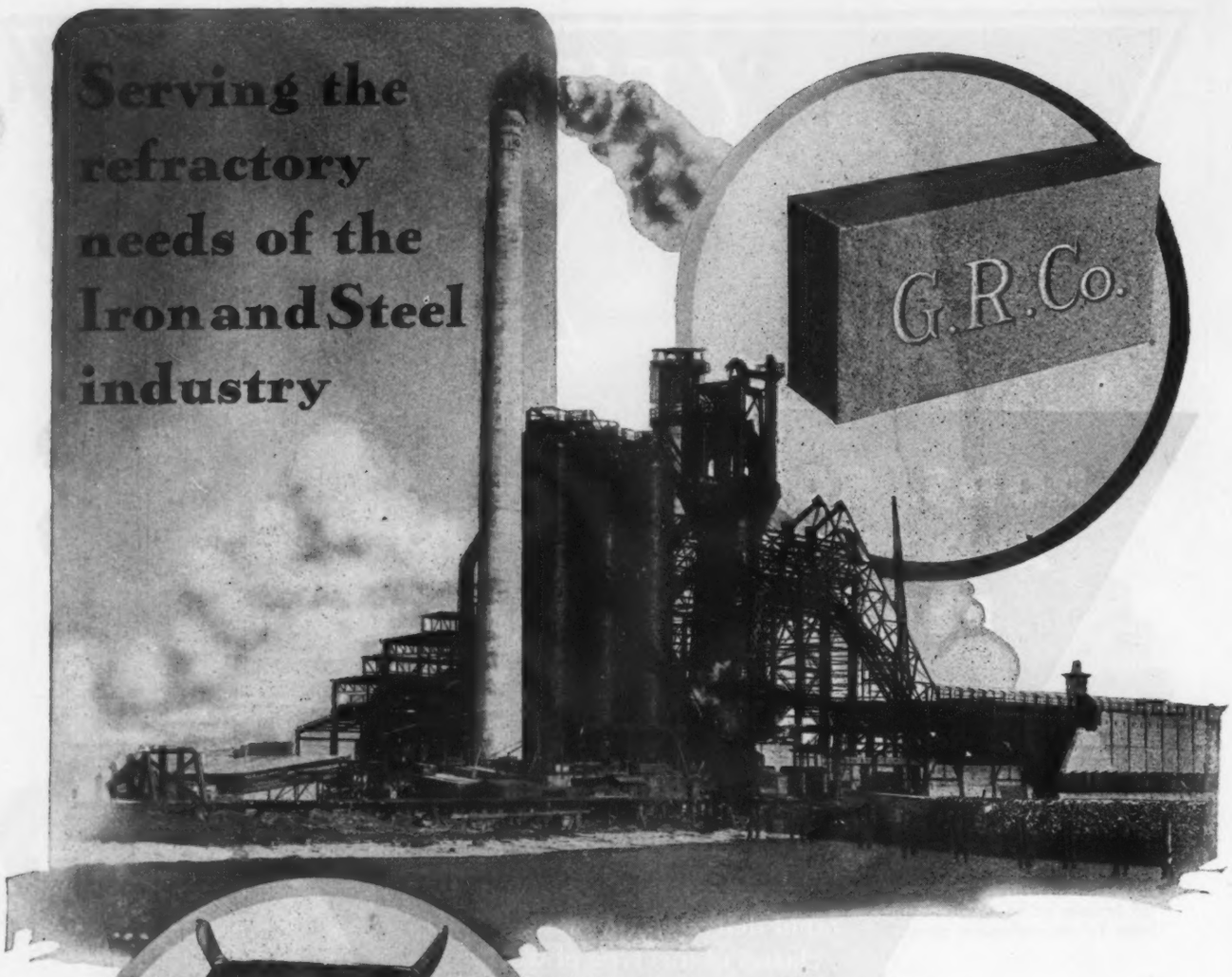
250 Park Avenue, NEW YORK
"We Bolt and Rivet the world together"



FROM huge Blast Furnaces and Open Hearths down to the smallest furnaces—General Refractories has been meeting every refractory need of the Iron and Steel Industry for many years.

Fire clay, silica, chrome, magnesite, high alumina refractories and high temperature cements—G. R. service is complete.

In selecting your next furnace lining or considering other refractory needs—it will pay you to consult a G. R. representative.

GENERAL REFRACTORIES COMPANY

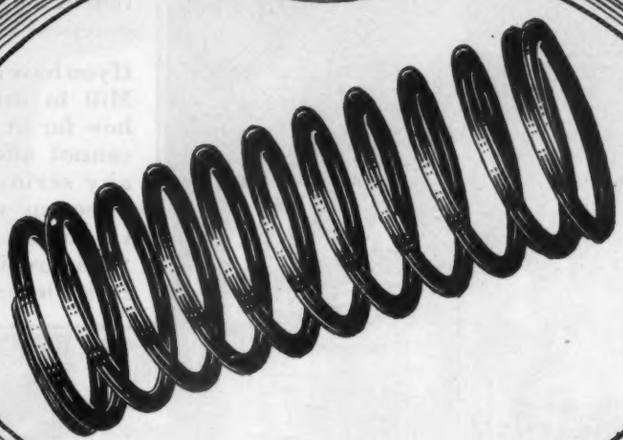
106 South 16th St., Philadelphia, Pa.

District Offices: Boston, Buffalo, Chicago, Cleveland, Detroit, Indianapolis, New York, Pittsburgh, San Francisco

Representatives: Seattle, Montreal, Havana, Cuba.

3836

B.G.R. INC.



Why "Better-Springs"?

Because they are

SPRINGS of carefully selected materials, tested for the particular work desired.

SPRINGS made on completely modernized equipment, including continuous electric or gas-fired furnaces.

SPRINGS delivered to schedule and tested if desired under actual working conditions.

AND MOST IMPORTANT springs made by an organization thoroughly versed in every phase of this complicated craft.

Address inquiries to either division

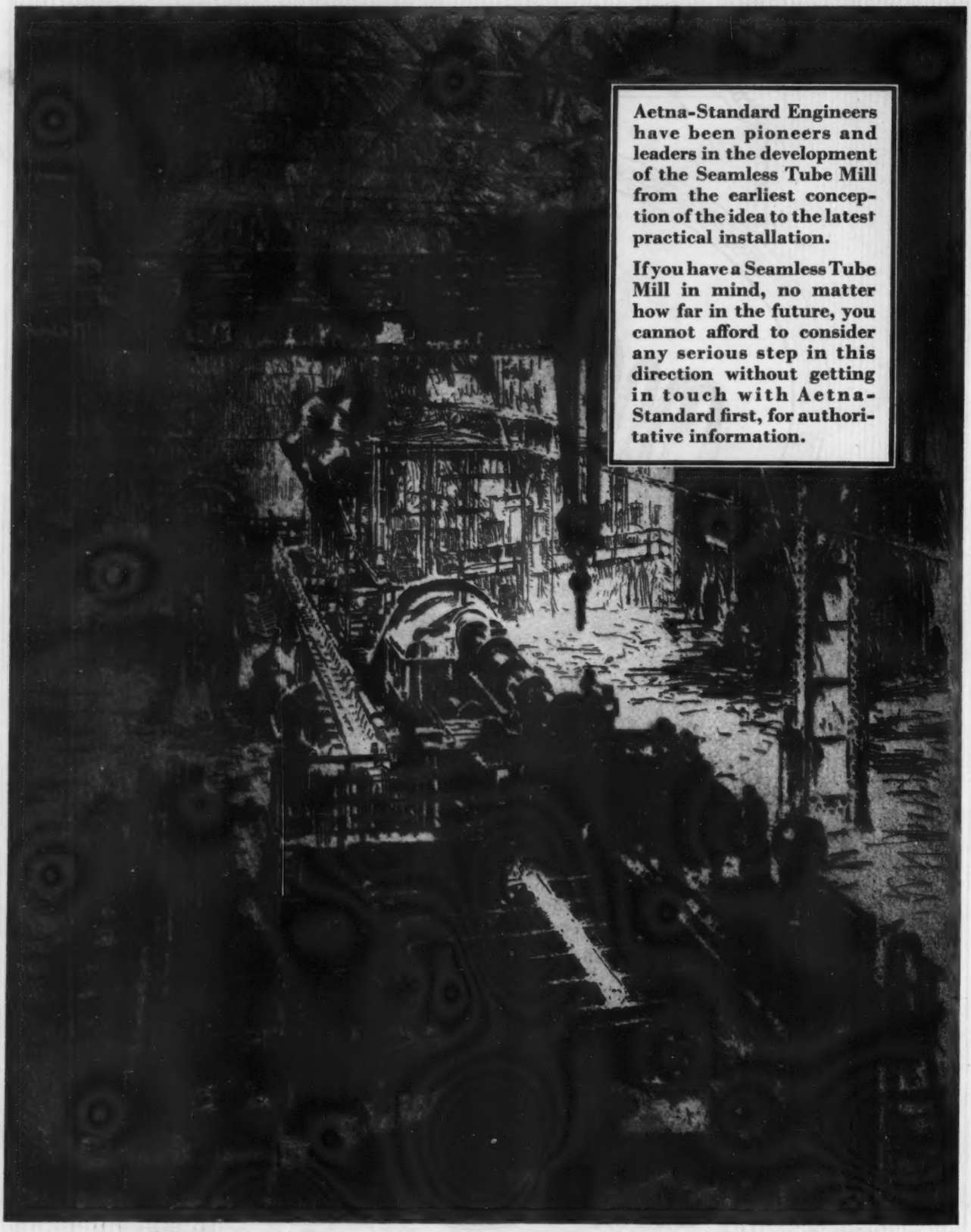
«Two Plants for Spring Service»

DETROIT DIVISION
6400 MILLER AVENUE

BGR INC.

COOK SPRING DIV'N
ANN ARBOR, MICH.

BARNES-GIBSON-RAYMOND-INC



Aetna-Standard Engineers have been pioneers and leaders in the development of the Seamless Tube Mill from the earliest conception of the idea to the latest practical installation.

If you have a Seamless Tube Mill in mind, no matter how far in the future, you cannot afford to consider any serious step in this direction without getting in touch with Aetna-Standard first, for authoritative information.

From an etching of A SEAMLESS TUBE MILL

The AETNA-STANDARD ENGINEERING CO.

YOUNGSTOWN, OHIO — ROLLING MILL MACHINERY

CROSBY STAMPINGS

In thirty-three years we have learned to take the wrinkles out of most stamped parts before they get in.

That is the sort of background of experience which reduces costs, improves results, builds solid satisfaction for our customers.

We stamp zinc, brass, copper, duralumin, aluminum, open hearth, hot or cold rolled, high carbon or stainless steel—any quantity.

Have you seen the catalog? It shows 22 pages of dimensioned photographs of work we have done. "Examples speak louder than words."

THE CROSBY COMPANY

General Offices and Works: BUFFALO, N. Y.

Branch Offices: Chicago, Cleveland, Detroit, New York

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Why Can't Your Product Come Out of Republic Strip Steel?

Republic Strip Steel—hot or cold rolled—is successfully solving the problem of quality at lower producing costs for thousands of products.

Republic, one of the largest producers of strip, has also been one of the leading pioneers in introducing new, economic uses for this form of steel . . . as, for instance, the making of automobile fenders from cold rolled strip.

Republic Strip Steel is available in almost any length—2500 feet is not unusual—and in widths from ¾ inch to 31½ inches inclusive.

If your's is a problem of stamping . . . or of deep drawing . . . or perhaps, at present, a casting . . . learn what can be accomplished with strip steel of Republic quality, and the production cost differentials.

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Pig Iron
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From Lake Erie to all over the world . . . . .

"Try Lake Erie on your next order and note how p. mptly we ship."

YOUR orders from Lake Erie's great stocks of standard bolts and nuts are never held up due to lack of shipping facilities. On our railroad siding two rows of "empties" stand, every morning. From shipping rooms above, boxes and kegs of Lake Erie bolts and nuts ride chutes to loading platforms, and are trucked into the cars. There is a constantly growing demand for Lake Erie bolts and nuts because they are made to the highest practical standards of strength and accuracy.

THE LAKE ERIE BOLT & NUT COMPANY
East 63rd Street at N. Y. C. R. R. Cleveland, Ohio

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A stock of 20 *million* . . .

AT convenient warehouse points and at the factory, more than 20 million Cleveland Cap Screws are in stock at all times, in a full list of sizes, S. A. E. and U. S. S. threads. You can depend on your order for any quantity being filled quickly because of these huge stocks maintained for immediate shipment.

And these cap screws are all made by the Kaufman Method, *patented,* the best cap screws we have ever made. Unlike any cap screws you have ever used, no doubt, in tensile strength and thread accuracy. Try them on a production job where time means money . . . and you'll be money and time ahead.

THE CLEVELAND CAP SCREW CO., 2921 E. 79th St., Cleveland, Ohio

Address the Nearest Company Warehouse—Complete Stocks At

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CLEVELAND

CAP SCREWS

RUSTLESS IRON LUBRICATION

Lubrication is just as necessary for the drawing of Rustless Chrome Iron Alloys as it is for similar operations with other metals. In fact, the greater strength of rustless materials necessitates a greater friction between blankholder and die surfaces to prevent wrinkling and most careful selection of lubricants is required to minimize die marks on the articles and to prolong the life of the tools.

Without going into too much detail, it can be stated that mineral oils are generally not suitable for this class of material. Organic oils should be used. Animal fats and vegetable oils might be applied mixed or separately. These lubricants are sold under various trade names and in selecting the proper kind it is important that the mixture is "acidfree" and is "as little viscous as possible". It can be recommended to use for more difficult draws a mixture of hard soap dissolved in warm water and vegetable oil for only one drawing operation or several operations in quick succession. If there is much time between redraws, this lubricant will not give full satisfaction.

For very difficult operations a pastelike mixture of corroded white lead and raw or boiled linseed oil will be beneficial. A very excellent mixture can be boiled together according to the following formula.

White lead	1 lb.
Fishoil	.30 gal.
Water	.15 gal.
Graphite	3 oz.

The addition of graphite will be helpful for many other mixtures. Its addition has been one of the secrets of foremen and experts in stamping plants.

Usually the lubricant is applied with a brush or the blank is dipped in the case of more liquid solutions. For mass production special lubricating machines are used whereby the blanks are passed through rollers which are partly immersed into a trough containing the lubricant.

The proper consideration of the lubrication problem when drawing Rustless Chrome Iron Alloys will avoid much grief and will save much money which otherwise is spent for regrinding and replacing dies and for broken pieces.

RUSTLESS IRON CORPORATION OF AMERICA

Executive Office
122 East 42nd Street, New York

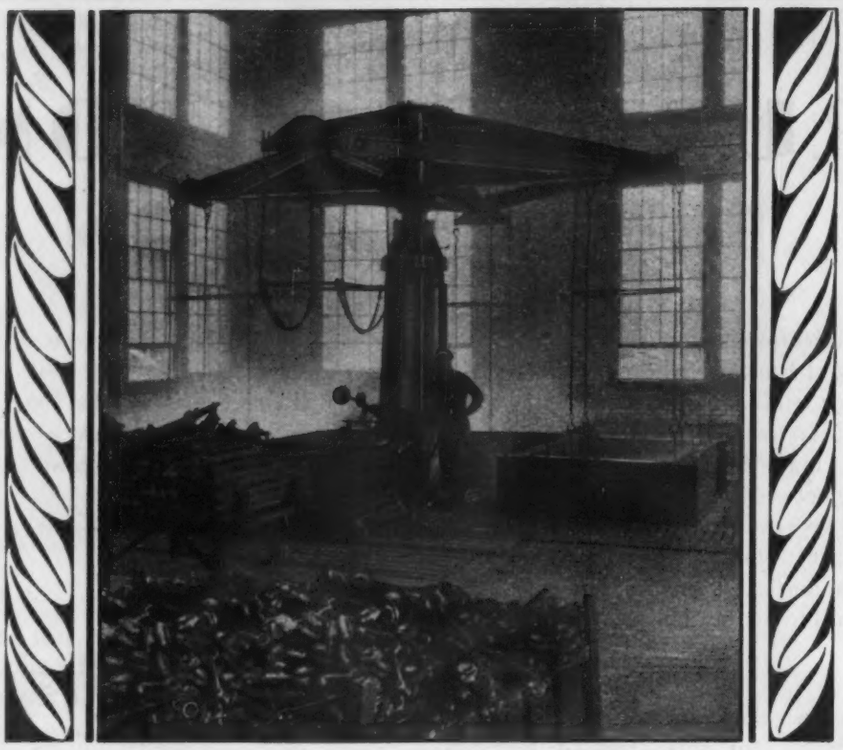
Works
Baltimore, Md.

Detroit
2100 Fisher Bldg.

Pittsburgh
Grant Bldg.

Chicago
310 So. Michigan Blvd.

Philadelphia
Fid.-Phila. Trust Bldg.



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With Mesta Patented Pickling Machine your costs are but ⅓ of what you pay to pickle by hand.

Acid cost is ⅓—labor cost ⅓—time required ⅓.

Furthermore, thorough uniform pickling results.

Call a Mesta engineer. He can show you the way to better cleaning at ⅓ the cost.

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MESTA

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the basic metal of industry
. . the name "Carnegie" has been identified with steel manufacture for nearly three quarters of a century . . . . . a good name to look for on Steel . . . . . .

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UNIVERSAL PORTLAND CEMENT COMPANY

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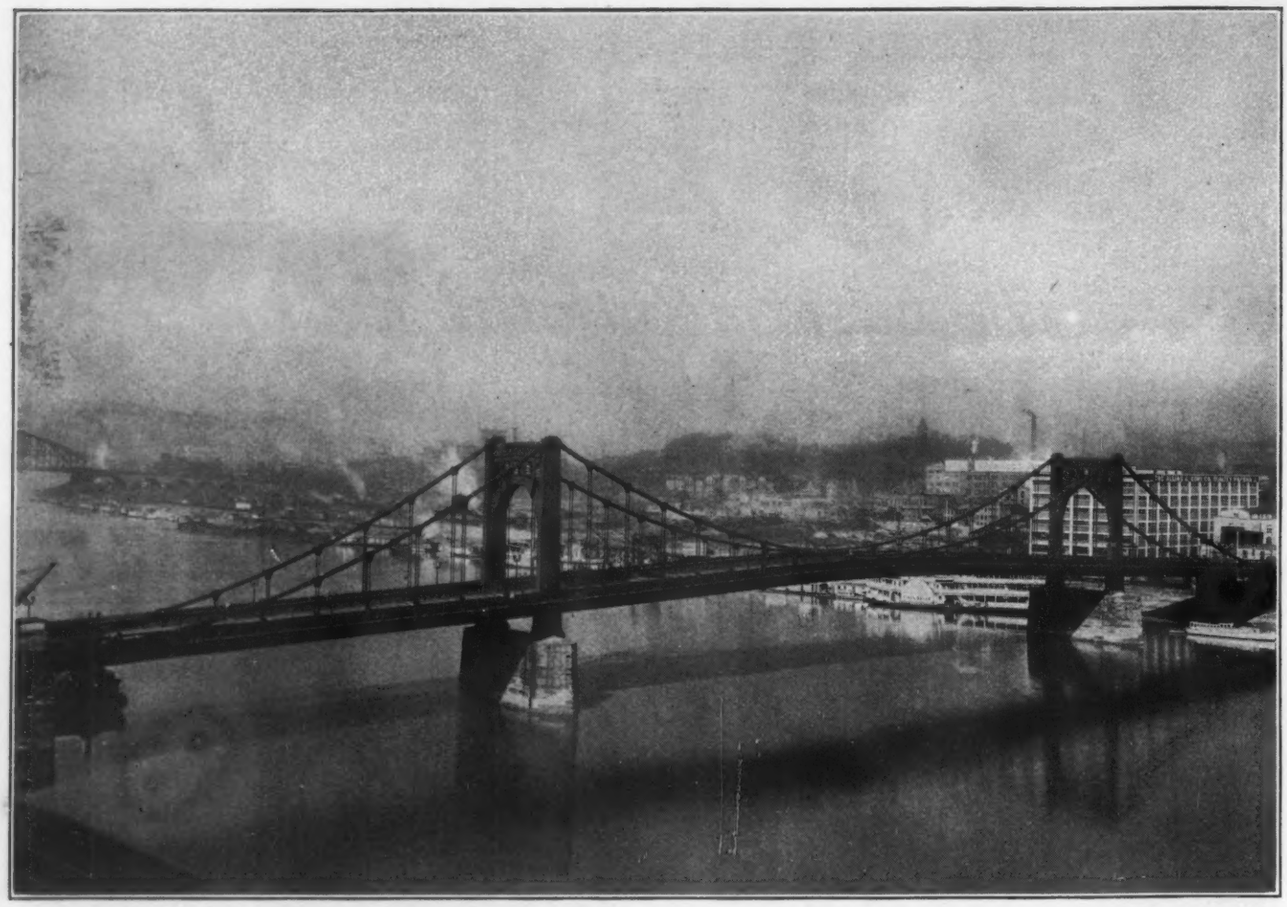

Illustration: The SIXTH STREET BRIDGE over Allegheny River at Pittsburgh, Pa., selected by a national jury appointed by AMERICAN INSTITUTE OF STEEL CONSTRUCTION as the most beautiful bridge completed in 1928.

The STRUCTURAL STEEL in the superstructure of this bridge was produced by Carnegie Steel Company, and FABRICATED and ERECTED by

AMERICAN BRIDGE COMPANY

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General Offices: 71 Broadway, New York, N. Y.

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Manufacturers of Steel Structures of all classes particularly

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DURING the entire course of its lifetime The Youngstown Sheet and Tube Company has rigidly adhered to the single standard—both in Quality and in Service.

By producing its own raw materials and handling every process in its own plants, Youngstown has been able to maintain the unvarying high standard of quality that has always featured every Youngstown product, whether steel pipe, sheets, bars, wire products or conduit.

And the standard of Youngstown service never varies with the size of the order. Every customer receives the same personal attention, the same careful regard to his every requirement, no matter how large or how small his order may be!

In dealing with The Youngstown Sheet and Tube Company you are assured of this single standard in Quality and Service that has come to be recognized throughout the trade as a Youngstown tradition.

YOUNGSTOWN

Galvanized Sheets Protect

Save With Steel

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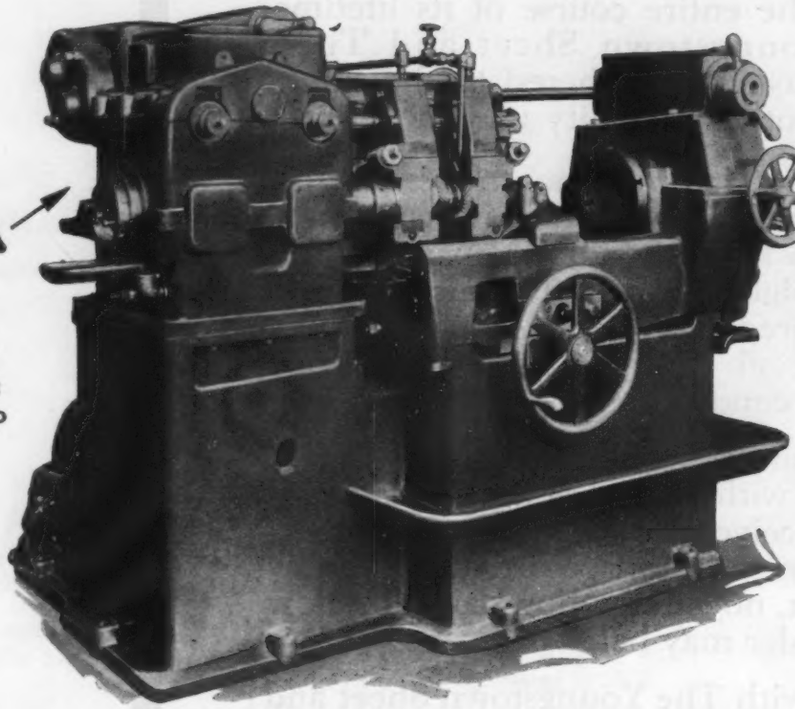

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CAPACITY

¼″ to 12″ dia.
¼″ to 5″ face
20 DP to 5 DP

850

Cutting Strokes Per Minute

Phenomenal Production with Requisite Accuracy

TO any manufacturer of gears a Sykes Gear Generator is a profitable investment. It operates on a sound, fundamental principle, it is very rapid in action, simple in mechanism and unequalled for accuracy. Every machine tool feature which will conserve the operator's time has been added and the cutter expense reduced to a minimum. Each size of machine has a range and adaptability unobtainable with any other gear generator irrespective of price; for instance, each standard machine will generate spur, helical or herringbone gears, splined shafts and ratchets and will simultaneously generate cluster gears having different numbers of teeth. It will pay to ask us more about them.

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SUCCESSOR TO FARREL FOUNDRY & MACHINE CO., ANSONIA, CONN., AND BUFFALO, N. Y.
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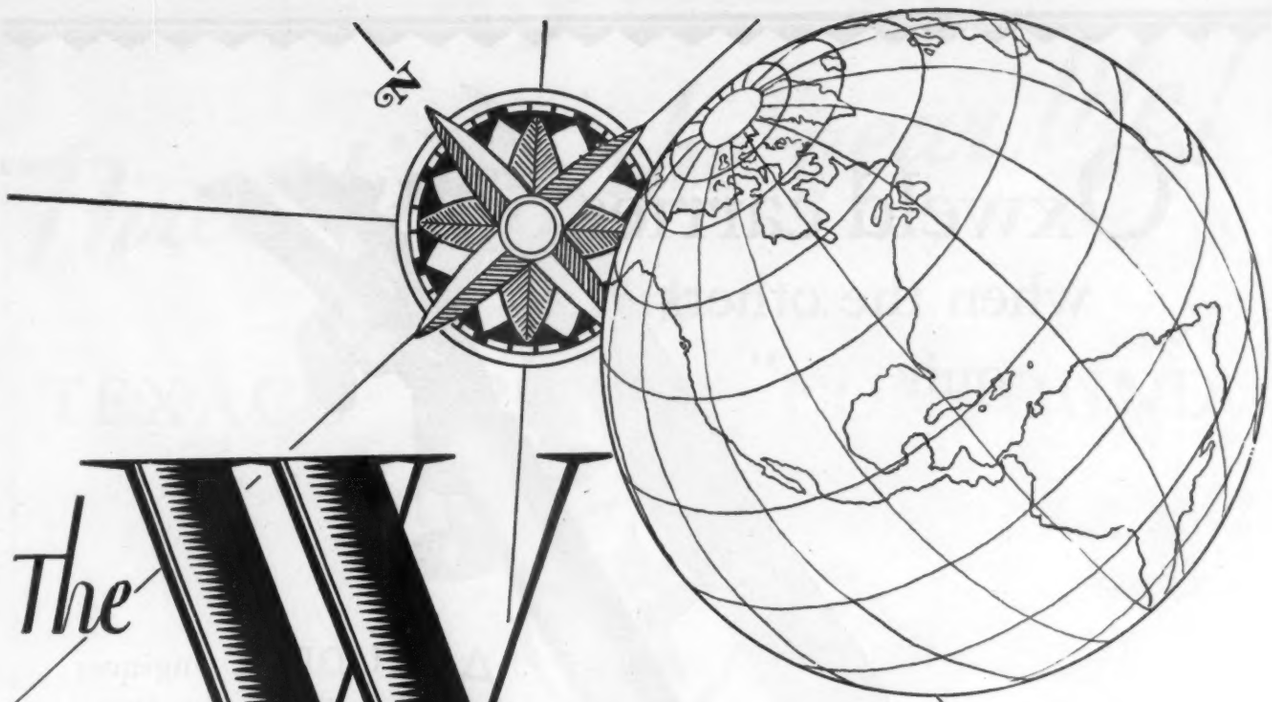
ADDRESS REPLIES TO THIS ADVERTISEMENT TO BUFFALO PLANT, 344 VULCAN ST., BUFFALO, N. Y.



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UNION DRAWN STEELS

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A STUDENT engineer characterizes the above phrase as "my simplest way of expressing the reason for my choice of Oxweld equipment as being superior to others." This young man had just completed his curricular requirement in oxy-acetylene welding and cutting at a prominent engineering school. Ninety-two per cent of his classmates also chose Oxweld.

There is a similar marked preference for Oxweld in industry. The reason is economic. Oxweld blowpipes, embodying the Oxweld low-pressure injector principle, give more welding, more cutting, more hours, months and years of operation. They carry on when the others quit.

Reliable—Economical—Long-Lived
Typically Oxweld

OXWELD

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IN CANADA: DOMINION OXYGEN CO., LTD., TORONTO

Three times the gear life!

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TEXACO CRATER COMPOUND

TEXACO Crater Compound is a remarkable gear lubricant. In one of the largest copper concentrators in Arizona there are eight Marcy Mills driven by individual 150 h.p. motors through reduction units and girth and pinion gears. These large exposed gears have been lubricated by Texaco Crater Compound continuously since they were installed. There have been no replacements and the pinions show but a slightly perceptible wear.

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The pinions lubricated by Texaco Crater Compound have had three times the life and are still in good condition for a long time to come.

There is nothing equal to Texaco Crater Compound for heavy gears and wire rope. It clings to the surfaces indefinitely . . . it protects and effectively lubricates. Write The Texas Company for information. Texaco Crater Compound costs far less than new parts—costs less per unit of service than any other lubricant of its kind on the market.

TEXACO LUBRICANTS

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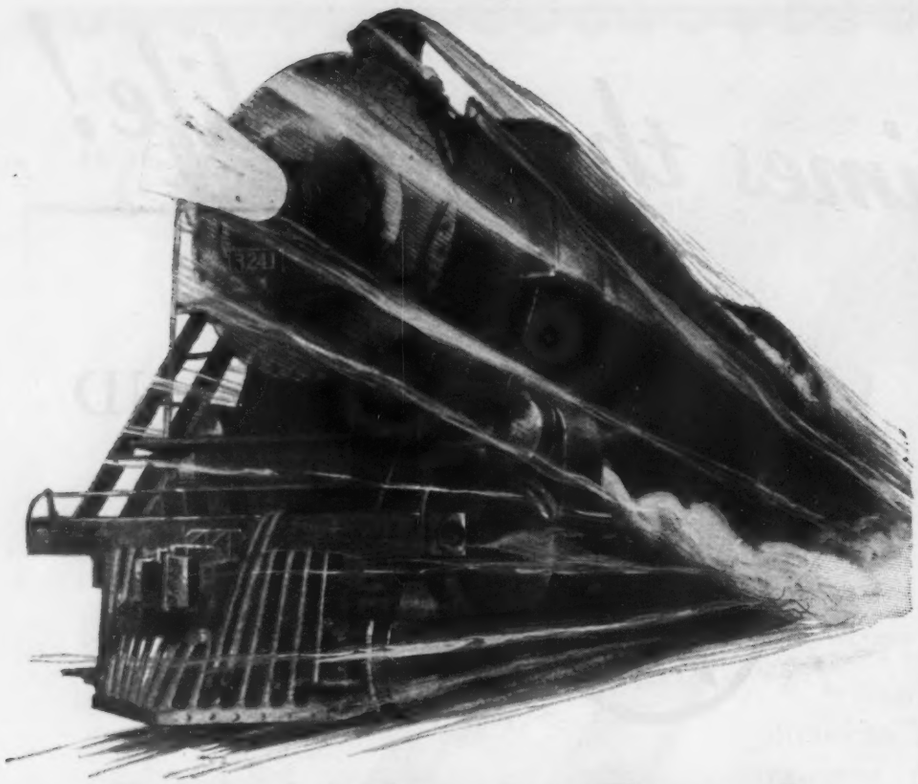
THERE IS A TEXACO LUBRICANT FOR EVERY PURPOSE



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Use the Ryerson Journal and Stock List—it is your guide to the thousands of tons of steel products carried in stock.

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And a hundred and one other tools.

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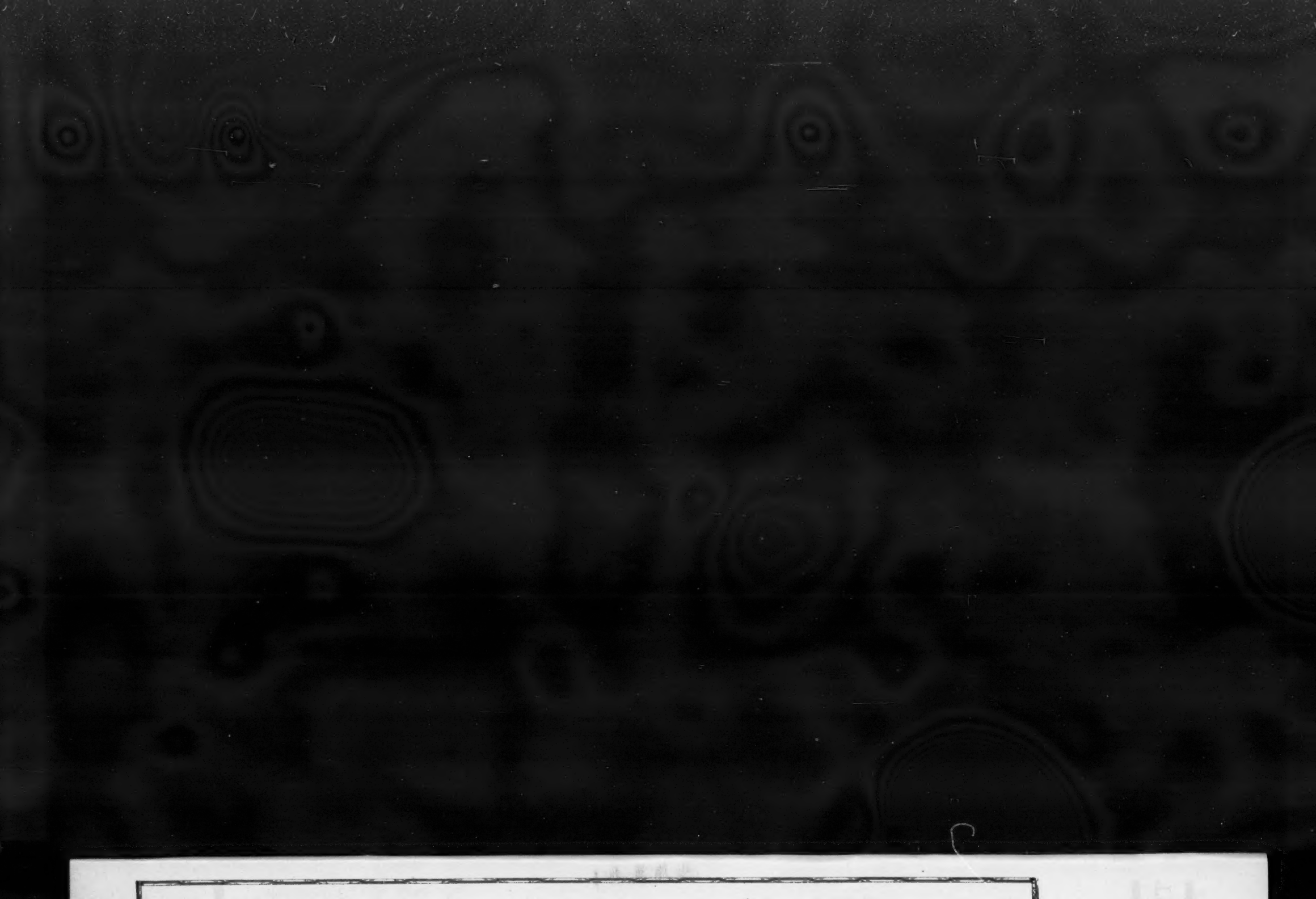

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Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh.
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Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.

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Norma-Hoffmann Bearings Corp., Stamford, Conn.
Roller Bearing Corp. of America, Trenton, N. J.

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Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Hinman, D. A., & Co., Sandwich, Ill.
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Long & Allstatter Co., Hamilton, O.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh.

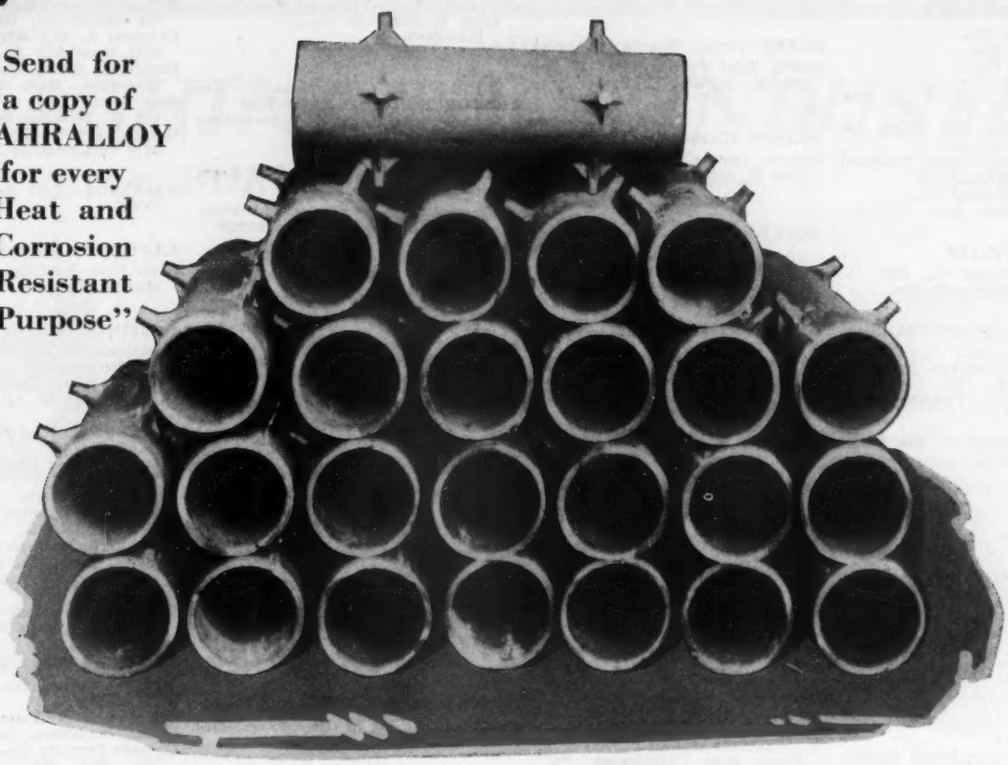
BILLET PEELERS
Manning, Maxwell & Moore, Inc., 100 E. 42nd St., New York City.

BILLETS (Alloy and Carbon Steel)
Central Alloy Steel Corp., Massillon, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Central Alloy Steel Corp., Massillon, O.
Erie Forge Co., Erie, Pa.
Heppenstall Forge & Knife Co., 47th and Hatfield, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

Send for a copy of "FAHRALLOY for every Heat and Corrosion Resistant Purpose"



Saves $9,046 *Using* FAHRALLOY Retorts

The following unbiased facts are quoted from a report made by company engineers in the plant of a leading automobile manufacturer.

"The following figures show the cost of retorts, cost for refractory Venturas, saving made, etc.:
Refractory Venturas cost each—$3.75.
Average life about two months.
Ventura upkeep per section per year—$3.75 × 12 ÷ 2 = $22.50.
Number of sections in use in body building—326.
Total cost per year Ventura upkeep—326 × $22.50 = $7,335.00.
Total cost for two years — 2 × $7,335.00 = $14,670.00.
Weight of FAHRALLOY Retort — 25 lbs.
Cost per lb. — 85¢.
Cost each — 25 × 85¢ = $21.25.
Allowance for scrap — 20¢ per lb.
Allowance each — 25 × 20¢ = $5.00.
Net cost each — $21.25 − $5.00 = $16.25.
Correction for loss in weight (est.) — $1.00.
Total net cost each — $17.25.
*Probable life of retort — two years.
Total cost to change over — 326 × $17.25 = $5,623.50.

SUMMARY

Refractory Ventura cost in two years	$14,670.00
FAHRALLOY Retort cost in two years	5,623.50
Saving	$ 9,046.50

"There will be other savings made that are not shown here, such as far less cleaning of heaters required, fuel oil burned completely, thus saving oil, better heat transfer secured in heater, etc."

Regardless of the work—where heat and corrosion must be coped with — use FAHRALLOY, made in many different analyses, each suited to some particular condition. This super-metal will return its cost many times in trouble-free operation and reduced maintenance.

*The first FAHRALLOY Retorts were installed in the Fall of 1927 and today, after 24 months, show no signs of failure. All indications point to ultra-conservatism in the above estimate of possible savings written two years ago.

SOUTHERN MANGANESE STEEL CO.

(Division of American Manganese Steel Co.)

Plant—General Office, 6600 Ridge Ave., St. Louis, Mo.

Sales and Engineering Offices

New York, Chicago, Pittsburgh, Cleveland, Detroit, Denver
Oakland, Los Angeles, New Castle, Del., Easton, Pa.
Chattanooga.

use AMSCO Fahralloy heat and corrosion resistant

BILLETS (Forging, Alloy Steel)
Bethlehem Steel Co., Bethlehem, Pa.

BILLETS AND BLOOMS
Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Illinois Steel Co., 208 South La Salle St., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago.

BILLETS AND SLABS
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.

BLAST FURNACE SPECIALTIES
Bailey, Wm. M., Co., Magee Bldg., Pittsburgh, Pa.
Brosius, Edgar E., Inc., Sharpsburg P. O., Pittsburgh, Pa.

BLAST FURNACES — See FURNACES (Blast)

BLOWERS
General Electric Co. Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York City.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, Ohio.

BLOW PIPES (Brazing, Welding Cutting, Etc.)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

BOILER HEADS
Bethlehem Steel Co., Bethlehem, Pa.

BOILER SETTINGS & CHIMNEYS
Detrick, M. H., Co., 140 S. Dearborn St., Chicago, Ill.
Rust Engineering Co., 2600 Koppers Bldg., Pittsburgh

BOILER TUBES — See TUBES (Boiler)

BOILERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Combustion Engineering Corp., 200 Madison Ave., New York City.

BOLT AND NUT MACHINERY
Landis Machine Co., Waynesboro, Pa.

BOLTS
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Foster Bolt & Nut Mfg. Co., Union Ave., at E. 72nd St., Cleveland, O.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Kirk-Latty Co., 1971 W. 85th St., Cleveland, O.
Lake Erie Bolt & Nut Co., 915 E. 63rd St., Cleveland, O.
Lamson & Sessions Co., The, 2188 Scranton Rd., Cleveland, O.
Neely Nut & Bolt Co., 2101 Wharton St., Pittsburgh.
Oliver Iron & Steel Corp., S. 10th and Muriel Sts., Pittsburgh.
Pittsburgh Screw & Bolt Co., Preble Ave., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, Ohio.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Wrought Iron Co. of America, Lebanon, Pa.

BOOKS (Technical)
Penton Publishing Co., Cleveland, O.

BOXES (Carbonizing)
Driver-Harris Co., Harrison, N. J.
Farrell-Cheek Steel Foundry Co., Sandusky, O.

BOXES (Open Hearth Charging)
Strong Steel Foundry Co., 38 Norris St., Buffalo, N. Y.

BRAKES (Crane)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland.

BRAKES (Electric)
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

BRICK (Insulating) — See INSULATING BRICK

BRICK (Refractory)—See REFRACTORIES

BRIDGE CRANES (Ore and Coal Handling)
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

BRIDGES, BUILDINGS, VIADUCTS, STACKS (Steel)
American Bridge Co., 71 Broadway, New York City.
Belmont Iron Works, 22nd and Washington Ave., Philadelphia.
Eichleay, John, Jr., Co., S. 20th and Wharton, Pittsburgh, Pa.
McClintic-Marshall Co., Oliver Bldg., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, Ohio.
Phoenix Bridge Co., 20 S. 15th St., Philadelphia, Pa.
Truscon Steel Co., Youngstown, Ohio.

BRONZE (Centrifugally Cast)
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh, Pa.

BRONZE (Manganese)
Bethlehem Steel Co., Bethlehem, Pa.

BUCKETS (Clam Shell, Dragline, Grab, Single Line)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh.
Brosius, Edgar E., Inc., Sharpsburg P. O., Pittsburgh, Pa.
Harnischfeger Corp., 3811 National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., 4408 St. Clair Ave., Cleveland.
Milwaukee Electric Crane & Hoist Corp., 60th & Greenfield Ave., Milwaukee, Wis.
Owen Bucket Co., The, 6013 Breakwater Ave., Cleveland.
Williams, G. H., Co., 611 Haybarger Lane, Erie, Pa.

BUCKETS (Dumping)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.

BUCKETS (Elevator)
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.

BUILDINGS (Industrial)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

BUILDINGS (Steel)—See BRIDGES, BUILDINGS, VIADUCTS, STACKS (Steel)

BULLDOZERS
Beatty Machine & Mfg. Co., Hammond, Ind.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Long & Allstatter Co., Hamilton, O.

BURNERS (Acetylene) — See TORCHES AND BLOWERS (Acetylene, Blow, Oxy-Acetylene)

BURNERS (Automatically Regulated)
American Heat Economy Bureau, Inc., Wabash Bldg., Pittsburgh.

BURNERS (Fuel, Oil, Gas, Combination)
Babcock & Wilcox Co., 85 Liberty St., New York City.
Maehler, Paul, Co., The, 2210 West Lake St., Chicago, Ill.
Strong, Carlisle & Hammond Co., The, 1392 W. 3rd St., Cleveland.
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.

BY-PRODUCT PLANTS
Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh.

CAN MAKING MACHINERY
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.

CAP SCREWS —See SCREWS (Cap and Set)

CARBON BURNING APPARATUS
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

CAR DUMPERS
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

CARS (Industrial and Mining)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.

CARS (Ingot and Open Hearth Charging)
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

CASTINGS (Acid Resisting)
Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS (Acid Resisting—Brass, Bronze and Aluminum)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTINGS—Alloy (Acid Resisting)
National Alloy Steel Co., Blawnox, Pa.

CASTINGS (Alloy Steel)
Alloy Cast Steel Co., The, Marion, Ohio.
Babcock & Wilcox Tube Co., 85 Liberty St., New York City.
Bethlehem Steel Co., Bethlehem, Pa.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Industrial Steel Castings Co., Toledo, O.
Sivyer Steel Casting Co., Milwaukee, Wis.
Treadwell Engineering Co., Easton, Pa.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
Western Crucible Steel Casting Co., Minneapolis, Minn.

CASTINGS (Bessemer Iron)
Valley Mould & Iron Corp., Hubbard, Ohio.

CASTINGS (Brass, Bronze, Copper, Aluminum)
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bronze Die Cast Corp., 100 Arthur St., Buffalo, N. Y.
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh.
Enterprise Brass Works, Muskegon, Mich.
Erie Bronze Co. 402 W. 19th St., Erie, Pa.
General Bronze Co., 3216 Smallman St., Pittsburgh.

CASTINGS (Die) See DIE CASTINGS

CASTINGS (Electric Flux)
Alloy Cast Steel Co., The, Marion, Ohio.

CASTINGS (Electric Steel)
American Rolling Mill Co., Middletown, O.
Crucible Steel Castings Co., The Almira and W. 84th St., Cleveland, O.
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Industrial Steel Castings Co., Toledo, O.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee, Wis.
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh, Pa
Sivyer Steel Castings Co., Milwaukee, Wis.
West Steel Castings Co., The, 805 E. 70th St., Cleveland, O

CASTINGS (Gray Iron)
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Cascade Foundry Co., 19th and Plum Sts., Erie, Pa.
Forest City-Walworth Run Foundries, W. 27th & Nickel Plate R. R., Cleveland, Ohio.
Lake Shore Engine Works, Marquette, Mich.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engineering & Foundry Co. Farmers Bank Bldg., Pittsburgh

CASTINGS (Heat Resisting)
Driver-Harris Co., Harrison, N. J.
National Alloy Steel Co., Blawnox, Pa.
Southern Manganese Steel Co., St. Louis, Mo.

CASTINGS (Malleable)
Iowa Malleable Iron Co., Fairfield, Iowa.
Link-Belt Co., 300 W. Pershing Rd. Chicago, Ill.
Meeker Foundry Co., Clay & Ogden Sts., Newark, N. J.
Peoria Malleable Castings Co., Peoria, Ill.
Vermilion Malleable Iron Co., Hoopeston, Ill.

CASTINGS (Manganese Steel)
Alloy Cast Steel Co., The, Marion, Ohio.
American Manganese Steel Co., Chicago Heights, Ill.

CASTINGS (Nickel Chromium)
Alloy Cast Steel Co., The, Marion, Ohio.
Driver-Harris Co., Harrison, N. J.
Southern Manganese Steel Co., St. Louis, Mo.

CASTINGS (Steel)
Alloy Cast Steel Co., The, Marion, Ohio.
American Adamite Co., The, 410 Oliver Bldg., Pittsburgh, Pa
American Rolling Mill Co., Middletown, O.
American Steel Foundries, 410 No Michigan Ave., Chicago, Ill.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

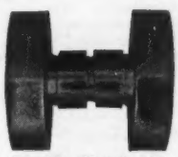
THE JOHNSON FRICTION CLUTCH

As Used In The

MACHINE TOOL INDUSTRY

On BORING MACHINES —

— On SCREW MACHINES



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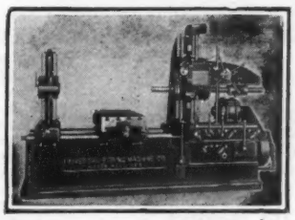
JOHNSONS GIVE 15 to 20 YEARS SERVICE

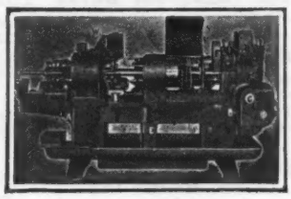
BORING MILL

The clutch that all America and Europe know as the clutch of quality, compactness, performance and dependability—the JOHNSON. Prompt-start. Quick-stop. Absolute control.



The Universal Boring Machine Co.

AUTOMATIC SCREW MACH.



The Cleveland Automatic Machine Co.

WRITE for CATALOG "WHITE—124"

Our JOHNSON users' list reads like a roll call of American Machine Tool builders. National Acme alone has used 16,000 JOHNSON Clutches. We have 70,000 illustrated clutch reprints. They tell all. Gratis for the asking. Equip with JOHNSONS.

Single Clutch—Exterior

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

T-J Die Sinking MILLING CUTTERS

The 10 POINT LINE!—POINT 10—Fully Guaranteed

1—Low in Cost
2—Speedy
3—Accurate
4—Approved Designs
5—Best grade high-speed steel
6—Scientifically heat-treated
7—Low Breakage
8—Cover every cutting need
9—Made-to-order service
10—Fully guaranteed

WHEN we say "Fully Guaranteed"—we mean just that! "T-J" Milling Cutters will make good—or we will. You can order a trial lot and put them to the test. We say—"Let them sell themselves!" And they do.

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JACKSON MICH.

Representatives:
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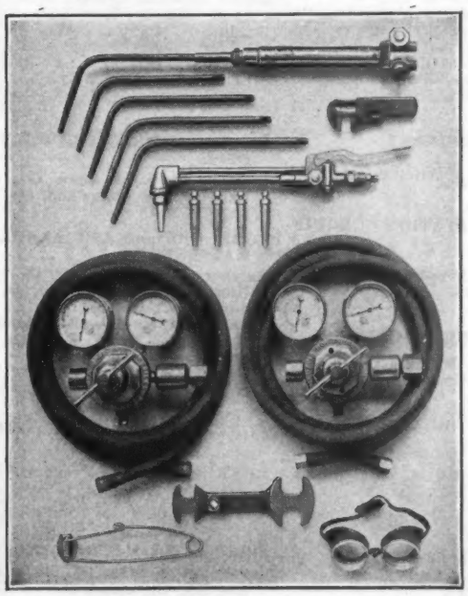
549 Washington Blvd., Chicago
Mr. R. B. McDonald,
335 Curtis Bldg., Detroit
Jenkins & Chaffee,
318 N. Clinton St.,
Syracuse, N. Y.
Evans Tool Co.,
335 S. Central Ave., Los Angeles, Cal.
J. C. Ross & Co.,
2207 First Ave., S. Seattle, Wash.

Let us quote. No obligation, of course.

Catalog and prices on our standard line will be sent you promptly. Just pin this book to your letterhead.

Send for Catalog

An Airco-Davis-Bournonville Combination Welding and Cutting Outfit No. 8888



A New Line—

Highly Efficient—

Low Priced—

AIR REDUCTION SALES COMPANY

Manufacturers and distributors of Airco Oxygen, Airco Acetylene, Airco National Carbide
Airco-Davis-Bournonville Welding and Cutting Apparatus and Welding Supplies

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AIRCO — DAVIS BOURNONVILLE

Home Office: 342 Madison Ave., New York City, N. Y.
88 Plants 25 District Offices

CASTINGS (Steel)—Cont.

Atlas Steel Casting Co., 1968 Elmwood Ave., Buffalo, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Columbia Steel Corp., San Francisco, Calif.
Commercial Steel Castings Co., The, Marion, O.
Crucible Steel Castings Co., The, Almira and W. 84th St., Cleveland, O.
Duquesne Steel Foundry Co., Union Bank Bldg., Pittsburgh, Pa.
Erie Forge Co., Erie, Pa.
Farrell Cheek Steel Foundry Co., Sandusky, O.
Industrial Steel Castings Co., Toledo, O.
Mackintosh-Hemphill Co., Penn Ave. at Water Sts., Pittsburgh, Pa.
Maynard Electric Steel Castings Co., 2-12 Kilbourn Rd., Milwaukee.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., The, Avonmore, Pa.
Reliance Steel Casting Co., 28th & Smallman Sts., Pittsburgh,
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, George H., Steel Casting Co., Milwaukee, Wis.
Strong Steel Foundry Co., 33 Norris St., Buffalo, N. Y.
Treadwell Engineering Co., Easton, Pa.
Union Steel Casting Co., 62nd and Butler Sts., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh.
West Steel Castings Co., The, 805 E. 70th St., Cleveland, O.

CASTINGS (Worm & Gear Bronze)

Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.

CASTORS (Plate Mills)—See PLATE CASTORS

CEMENT (High Temperature)

Carborundum Co., The, Perth Amboy, N. J.
General Refractories Co., 106 S. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bk. Bldg., Pittsburgh.
North American Refractories Co., 1012 National City Bank, Cleveland, Ohio.

CEMENT MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

CENTRAL STATION EQUIPMENT

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

CHAIN-MAKING MACHINERY

Nilson, A. H., Machine Co., Bridgeport, Conn.

CHAINS (For Drives, Conveyors & Elevators)

Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CHARCOAL

Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.

CHARGING MACHINES (Cupola)

Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CHEMICALS

Ford, The J. B., Co., Wyandotte, Mich.

CHROME ORE

General Refractories Co., 106 S. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bk. Bldg., Pittsburgh.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

CHROMIUM METAL

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

CHUCKING MACHINES (Automatic, Multiple Spindle)

National Acme Co., E. 131st St. and Coit Rd., Cleveland, O.

CLAY GUNS (Electric)

Bailey, Wm. M., Co., Magee Bldg., Pittsburgh, Pa.

CLEANERS (Metal)—See METAL CLEANERS

CLEANING SPECIALTIES

American Chemical Paint Co., Ambler, Pa.
Ford, The J. B., Co., Wyandotte, Mich.

CLUTCHES

Johnson, Carlyle, Machine Co., The, Manchester, Conn.

CLUTCHES (Cut-Off Coupling)

Johnson, Carlyle, Machine Co., The, Manchester, Conn.

CLUTCHES (Friction)

Johnson, Carlyle, Machine Co., The, Manchester, Conn.

COAL AND COKE

Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Eaton, Rhodes & Co., First National Bank Bldg., Cincinnati, O.
Hanna, M. A., The, Co., Leader Bldg., Cleveland, O.
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York.
Snyder, W. P., Co., Oliver Bldg., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

COAL CRUSHERS AND PULVERIZERS

Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.

COAL, ORE and ASH HANDLING MACHINERY

Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Webster & Weller Mfg. Co's., 1856 N. Kostner Ave., Chicago, Ill.

COKE—See COAL AND COKE

COKE OVENS (By-Product)

Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh, Pa.

COKE OVEN MACHINERY

Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.

COKE QUENCHING SYSTEMS

Dry Quenching Equipment Corp., 200 Madison Ave., New York City.

COLLET CHUCKS

Tomkins-Johnson Co., The, 617 N. Mechanic St., Jackson, Mich.

COMPENSATORS (Automatic)

Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.

COMPOUNDS (Metal Cleaning)

Parkin, Wm. M., Co., 1005 Highland Bldg., Pittsburgh, Pa.

COMPOUNDS (Pickling)

Parkin, Wm. M., Co., 1005 Highland Bldg., Pittsburgh, Pa.

COMPRESSORS (Air)

Allis-Chalmers Mfg. Co. Milwaukee, Wis.
General Electric Co., Schenectady, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York City.
Sullivan Machinery Co., 320 Wrigley Bldg., Chicago.

COMPRESSORS (Portable)

Independent Pneumatic Tool Co., 228 So. Jefferson St., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City.

CONCRETE MIXERS—See MIXERS (Concrete)

CONCRETE REINFORCING BARS—See BARS (Concrete Reinforcing)

CONDENSERS (Surface, Barometric, Multi-Jet)

Ingersoll-Rand Co., 11 Broadway, New York City.

CONDUITS (Electric)

Youngstown Sheet & Tube Co., Youngstown, O.

CONSTRUCTION (Industrial Buildings)

Austin Co., The, 16112 Euclid Ave., Cleveland, O.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROLLERS (Automatic)

Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland.

CONTROLLERS (Electric)

Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.

CONVEYORS (Elevating and Conveying)

Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

COTTER PINS

Hindley Mfg. Co., John St., Valley Falls, R. I.

COTTERS

Kirk-Latty Co., 1971 W. 85th St., Cleveland, O.
Lamson & Sessions Co., The, 2188 Scranton Rd., Cleveland, O.

COUNTING MACHINES

Veeder-Root, Inc., Hartford, Conn.

COUPLINGS (Flexible)

Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y.

CRANES

Bedford Foundry & Machine Co., Bedford, Ind.
Conkey, H. D., Co., Mendota, Ill.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Charging)

Alliance Machine Co., The, Alliance, O.
Morgan Engineering Co., Alliance, O.

CRANES (Creeper, Erection)

Harnischfeger Corp., 3811 National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.

CRANES (Electric)

Manning, Maxwell & Moore, Inc., 100 E. 42nd St., New York City.
Northern Engineering Works, 210 Chene St., Detroit, Mich.

CRANES (Electric Traveling)

Alliance Machine Co., The, Alliance, O.
Box Crane & Hoist Corp., Janney & E. Ontario Sts., Philadelphia.
Cleveland Crane & Engrg. Co., The, Wickliffe, O.
Harnischfeger Corp., 3811 National Ave., Milwaukee, Wis.
Milwaukee Electric Crane & Hoist Corp., 60th & Greenfield Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, 210 Chene St., Detroit, Mich.
Roeper Crane & Hoist Works, 1729 No. 10th St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Gantry)

Bedford Foundry & Machine Co., Bedford, Ind.
Cleveland Crane & Engineering Co., The, Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Hand)

Cleveland Electric Tramrail, Division of the Cleveland Crane & Engineering Co., Wickliffe, O.
Roeper Crane & Hoist Works, 1729 No. 10th St., Reading, Pa.

CRANES (Hand Traveling)

Box Crane & Hoist Corp., Janney and E. Ontario Sts., Philadelphia.
Milwaukee Electric Crane & Hoist Corp., 60th & Greenfield Ave., Milwaukee, Wis.

CRANES (Hydraulic)

Alliance Machine Co., The, Alliance, O.

CRANES (Jib)

Box Crane & Hoist Corp., Janney & E. Ontario Sts., Philadelphia
Cleveland Electric Tramrail, Division of the Cleveland Crane & Engineering Co., Wickliffe, O.

CRANES (Locomotive)

Harnischfeger Corp., 3811 National Ave., Milwaukee, Wis.
Industrial Brownhoist Corp., 4403 St. Clair Ave., Cleveland, O.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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MILWAUKEE, WIS. U.S.A.

Sleeper & Hartley
Worcester, Mass.
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Tube Cutting-Off Machines
Hoisting Machinery
Special Machinery
Electric Furnace Steel Castings
Gray Iron Castings
Electric Furnace Iron Castings

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ROD MILLS ~ DRAW BENCHES ~
WIRE DRAWING AND HANDLING EQUIPMENT.
FOR STEEL, COPPER AND ALLOYS.

CRANES (Overhead)
Milwaukee Electric Crane & Hoist Corp., 60th & Greenfield Ave., Milwaukee, Wis.

CRANES (Portable)
Beatty Machine & Mfg. Co., Hammond, Ind.

CRANK SHAFTS
Champion Machine & Forging Co., 3675 E. 78th St., Cleveland.

CRUSHING, GRINDING AND PULVERIZING MACHINERY
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Fuller Lehigh Co., Fullerton, Pa.
Morgan Engineering Co., Alliance, O.

CUTTING AND WELDING (Oxy-Acetylene Process)—See WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene Process)

CUTTING AND WELDING APPARATUS—See WELDING AND CUTTING APPARATUS (Electric Arc)

CUTTING OILS
Sun Oil Co., 1608 Walnut St., Philadelphia, Pa.

CYLINDERS (Acetylene) — See ACETYLENE IN CYLINDERS

CYLINDERS (Oxygen) See OXYGEN IN CYLINDERS

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.

DECARBONIZING APPARATUS
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

DEOXIDIZERS
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 120 Broadway, New York City.

DIE BLOCKS
Bethlehem Steel Co., Bethlehem, Pa.
Heppenstall Forge & Knife Co., 47th and Hatfield, Pittsburgh, Pa.

DIE CASTINGS
Allied Die-Casting Corp., Honeywell St. & Skillman Ave, Long Island City, N. Y.
Newton Die Casting Corp., 146 Munson St., New Haven, Conn.
Stewart Die Casting Corp., 4535 Fullerton Ave., Chicago, Ill.

DIE HEADS (Automatic)
Landis Machine Co., Waynesboro, Pa.
National Acme Co., E. 131st St. and Coit Rd., Cleveland.

DIE SINKING MILL CUTTERS
Tomkins-Johnson Co., The, 617 N. Mechanic St., Jackson, Mich.

DIE STEEL
Heppenstall Forge & Knife Co. 47th and Hatfield, Pittsburgh.

DIES
Bethlehem Steel Co., Bethlehem, Pa.
Niagara Machine & Tool Works, 685 Northland Ave., Buffalo, N. Y.
Toledo Machine & Tool Co., Toledo, O.

DOLOMITE MACHINES (Back Wall)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

DOORS AND SHUTTERS (Steel, Fire and Rolling)
Kinnear Mfg. Co., 818-868 Field Ave., Columbus, O.
Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky
Truscon Steel Co. (Pressed Steel Div.), Youngstown, O.

DRAW BENCHES
Vaughn Machinery Corp., Cuyahoga Falls, O.

DRILL RODS—See RODS (Drill)

DRILLING MACHINES (MULTIPLE, HEAVY DUTY)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLING MACHINES (Radial)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

DRILLS (Electric)
Independent Pneumatic Tool Co., 228 So. Jefferson St., Chicago.

DRILLS (Pneumatic)
Cleveland Pneumatic Tool Co., 8734 E. 78th St., Cleveland, O.
Independent Pneumatic Tool Co., 228 So. Jefferson St., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.

DRILLS (Rock)
Ingersoll-Rand Co., 11 Broadway, New York City.

DRIVES (Cut Herringbone Gears)
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y
Lewis Foundry & Machine Co., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

DRYERS (Paint, Varnish, Enamel, Chemical)
Drying Systems, Inc., 1814 Foster Ave., Chicago, Ill.
Machler, Paul, Co., The, 2210 West Lake St., Chicago, Ill.

DRYERS (Sand, Coal, Ores, Chemical, Etc.)
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.

DUST COLLECTING EQUIPMENT
Pangborn Corp., P. O. Box 858, Hagerstown, Md.

ECONOMIZERS
Babcock & Wilcox Co., 85 Liberty St., New York City.

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago

ELECTRIC TOOLS (Portable)—See TOOLS (Portable Electric)

ELEVATING AND CONVEYING MACHINERY — See CONVEYORS (Elevating and Conveying)

ELEVATORS (Bucket)
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Link-Belt Co., 300 W. Pershing Road, Chicago.

ENGINE LATHES—See LATHES (Engine)

ENGINEERS AND CONTRACTORS
Austin Co., The, 16112 Euclid Ave., Cleveland, O.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Costello Engineering Co., 519 Oliver Bldg., Pittsburgh.
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
Laughlin, Alex, & Co., First National Bank Bldg., Pittsburgh.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Pennsylvania Engineering Works, New Castle, Pa.
Phoenix Bridge Co., 20 South 15th St., Philadelphia, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Swindell, Wm., & Bros., P. O. Box 1753, Pittsburgh, Pa.
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

ENGINEERS (Consulting)
Austin Co., The, 16112 Euclid Ave., Cleveland, O.
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Freyn Engineering Co., 310 S. Michigan Ave., Chicago.
Kennedy, Julian, Bessemer Bldg., Pittsburgh, Pa.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Perin & Marshall, 11 West 42nd St., New York City.
Riehle Bros. Testing Machine Co., 1424 N. 9th St., Philadelphia.
Shover, Barton R., Oliver Bldg., Pittsburgh, Pa.
Townsend, Earl D., Federal Title & Trust Bldg., Beaver Falls, Pa.
Worthington, Warren, Oliver Bldg., Pittsburgh, Pa.

ENGINEERS, CONSULTING (By-Product Coke Oven and Gas Plants)
Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh.

ENGINES (Gas, Oil)
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.

FACING BLOCKS
Mummert-Dixon Co., Hanover, Pa.

FACING MACHINES (Structural)
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

FACTORY AND INDUSTRIAL BUILDINGS — See BRIDGES, BUILDINGS, VIADUCTS, STACKS (Steel)

FACTORY EQUIPMENT (Steel) —See STOOLS AND FACTORY EQUIPMENT (Steel)

FANS (Portable)
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FERROALLOYS
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Metal & Thermit Corp., 120 Broadway, New York City.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROCARBON TITANIUM
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROMANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia.
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa

FERROPHOSPHORUS
Rogers Brown & Crocker Bros Inc., 21 E. 40th St., New York

FERROSILICON
Electro Metallurgical Sales Corp. 30 E. 42nd St., New York City
Globe Iron Co., Jackson, Mich.
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York.
Vanadium Corp. of America, 120 Broadway, New York City.

FERROSILICON (ALUMINUM)
Vanadium Corp. of America, 120 Broadway, New York City.

FERROTUNGSTEN
Vanadium Corp. of America, 120 Broadway, New York City.

FERROVANADIUM
Electro Metallurgical Sales Corp. 30 E. 42nd St., New York City
Vanadium Corp. of America, 120 Broadway, New York City

FERRULES
Bay State Stamping Co., 886 Chandler St., Worcester, Mass.

FIRE BRICK
Evens & Howard Fire Brick Co., 920 Market St., St. Louis, Mo.

FIRE CLAY
Babcock & Wilcox Co., 85 Liberty St., New York City
Climax Fire Brick Co., Climax, Pa.
Eureka Fire Brick Works, First National Bank Bldg., Pittsburgh, Pa.
General Refractories Co., 106 E. 16th St., Philadelphia, Pa
Harbison-Walker Refractories Co. Farmers Bank Bldg., Pittsburgh
Kier Fire Brick Co., Oliver Bldg., Pittsburgh, Pa.
Laclede-Christy Clay Products Co. Ambassador Bldg., St. Louis, Mo
North American Refractories Co., 1012 National City Bank, Cleveland, Ohio.
Stowe Fuller Refractories Co., 1650 Union Trust Bldg., Cleveland.
Taylor, Chas., Sons Co., The, Burns St., Cincinnati, Ohio.
U. S. Refractories Corp., Mt. Union, Pa.

FIRE DOORS AND SHUTTERS
Kinnear Mfg. Co., The, 818-868 Field Ave., Columbus, O
Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky

FLASKS (Foundry)
Truscon Steel Co., Youngstown, Ohio.

FLOOR ARMORING
Blaw Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.

FLOORING—STEEL (Ventilating, Nonslipping, Fireproof)
Alan Wood Steel Co., Conshohocken, Pa.
Blaw-Knox Co., 602 Farmers Bk Bldg., Pittsburgh, Pa.
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa

FLOOR PLATES
See PLATES (Rolled Steel—Floor)

FLUORSPAR
Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa.
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York

FLUX (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City

FORGING BILLETS—See BILLETS (Alloy and Carbon Steel)

FORGING BILLETS—See BILLETS (Forging)

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

PITTSBURGH ROLLS CORPORATION

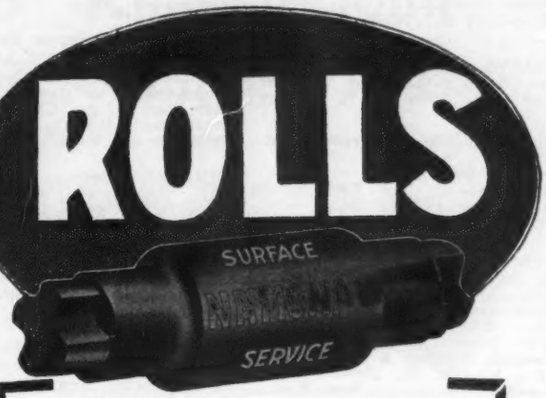
PHOENIX SAND ROLLS

PHOENIX CHILL ROLLS

PHOENIX STEEL ROLLS

PHOENIX METAL ROLLS

ROLLS



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For Merchant Bars and Rods.

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FORGING FURNACES
Chapman-Stein Co., The, Mt. Vernon, Ohio.
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.

FORGING MACHINERY
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.

FORGINGS (Brass, Bronze and Copper)
American Brass Co., 25 Broadway, New York.
Storms Drop Forging Co., Springfield, Mass.

FORGINGS (Drop)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Forge & Axle Co., 2001-2037 Dueber Ave., Canton, O.
Champion Machine & Forging Co., 3675 E. 78th St., Cleveland, O.
Drop Forging Co. of New York, 324 West Side Ave., Jersey City, N. J.
Fruin Drop Forge Co., 341-355 West Root St., Chicago, Ill.
Heppenstall Forge & Knife Co., 47th & Hatfield Sts., Pittsburgh.
National Lock Washer Co., 40 Hermon St., Newark, N. J.
Oliver Iron & Steel Corp., S. 10th and Muriel St., Pittsburgh.
Philadelphia Steel & Iron Co., Commercial Trust Bldg., Philadelphia, Pa.
Queen City Forging Co., The, 235 Tennyson St., Cincinnati, O.
Rockford Drop Forge Co., Rockford, Ill.
Steel Car Forge Co., 410 Frick Bldg., Pittsburgh, Pa.
Storms Drop Forging Co., Springfield, Mass.
Williams, J. H., & Co., 400 Vulcan St., Buffalo, N. Y.

FORGINGS (Hollow Bored)
Erie Forge Co., Erie, Pa.

FORGINGS (Iron and Steel)
Bay City Forge Co., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Drop Forging Co. of New York, 324 West Side Ave., Jersey City, N. J.
Erie Forge Co., Erie, Pa.
Heppenstall Forge & Knife Co., 47th and Hatfield, Pittsburgh.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Philadelphia Steel & Iron Co., Commercial Trust Bldg., Philadelphia, Pa.
Pittsburgh Forge & Iron Co., 801 Chamber of Commerce Bldg., Pittsburgh, Pa.
Rockford Drop Forge Co., Rockford, Ill.
Steel Car Forge Co., 410 Frick Bldg., Pittsburgh, Pa.
Williams, J. H., & Co., 400 Vulcan St., Buffalo, N. Y.

FORGINGS (Upset)
Neely Nut & Bolt Co., 2101 Wharton St., Pittsburgh.

FOUR-SLIDE MACHINES
Nilson, A. H., Machine Co., Bridgeport, Conn.

FROGS AND SWITCHES
Bethlehem Steel Co., Bethlehem, Pa.

FURNACE CONTROLS (Open Hearth)
Morgan Construction Co., Worcester, Mass.

FURNACE INSULATION
Armstrong Cork & Insulation Co., Lancaster, Pa.

FURNACES (Blast)
Brassert, H. A., & Co., 310 So. Michigan Ave., Chicago, Ill.
Freyn Engineering Co., 310 S. Michigan Ave., Chicago.
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.
Pollock, William B., Co., The, Youngstown, Ohio.

FURNACES (Continuous Pair)
Hagan, Geo. J., Co., Chamber of Commerce Bldg., Pittsburgh.
Strong, Carlisle & Hammond Co., 1392 West 3rd St., Cleveland.
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.

FURNACES (Electric)
Electric Furnace Co., The, Wilson St. at P. R. R., Salem, Ohio.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Swindell, Wm., & Brothers Co., P. O. Box 1753, Pittsburgh, Pa.
Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

FURNACES (Electric Melting)
American Bridge Co., 71 Broadway, New York City
General Electric Co., Schenectady, N. Y.
Hagan, Geo. J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa
Pittsburgh Electric Furnace Corp., P. O. Box 1125, Pittsburgh.

FURNACES (Open-Hearth)
Criswell, James, Co., Keenan Bldg., Pittsburgh, Pa.
Incandescent Heat Co., Ltd., The, Cornwall Rd., Smethwick, Birmingham, Eng.
Laughlin, Alex, & Co., First National Bank Bldg., Pittsburgh.

FURNACES (Recuperative)
Chapman-Stein Co., The, Mt. Vernon, Ohio.
Hagan, Geo. J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Incandescent Heat Co., Ltd., The, Cornwall Rd., Smethwick, Birmingham, Eng.

FURNACES (Sheet and Tin Mill)
Costello Engineering Co., 519 Oliver Bldg., Pittsburgh, Pa.
Incandescent Heat Co., Ltd., The, Cornwall Rd., Smethwick, Birmingham, Eng.
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

FURNACES (Steel Mill)
Chapman-Stein Co., Mt. Vernon, Ohio.
Morgan Construction Co., Worcester, Mass.
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.

FURNACES (Steel Treating, Annealing & Case Hardening)
Carborundum Co., The, Perth Amboy, N. J.
Chapman-Stein Co., The, Mt. Vernon, Ohio.
Costello Engineering Co., 519 Oliver Bldg., Pittsburgh, Pa.
Electric Furnace Co., The, Wilson St. at P. R. R., Salem, O.
Hagan, Geo. J., Co., Chamber of Commerce Bldg., Pittsburgh, Pa.
Rust Engineering Co., The, 2600 Koppers Bldg., Pittsburgh, Pa.
Strong, Carlisle & Hammond Co., 1392 W. 3rd St., Cleveland, O.
Surface Combustion Co., 2375 Dorr St., Toledo, Ohio.
Westinghouse Electric & Mfg. Co., Mansfield, Ohio.

GAGES (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

GALVANIZING
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh, Pa.

GALVANIZING (Hot Dip)
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh, Pa.

GALVANIZING PLANTS—FOR SHEETS
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie Foundry Co., Erie, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

GASOLINE
Texas Co., The, 17 Battery Place, New York City.

GAS (Welding and Cutting)
Prest-O-Lite Co., Inc., The, 30 E. 42nd St., New York City.

GAS METERS—SEE METERS (Gas and Air)

GAS PRODUCER PLANTS
Flinn & Dreffein Co., 308 W. Washington St., Chicago, Ill.
Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wellman-Seaver-Morgan Co., The, 7025 Central Ave., Cleveland, O.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

GAS RECOVERY COKE OVEN AND GAS PLANTS
Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh.

GEAR BLANKS
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bronze Die Cast Corp., 100 Arthur St., Buffalo, N. Y.

GEAR GENERATORS
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y.

GEARS (Reverse Marine)
Johnson, Carlyle, Machine Co., The, Manchester, Conn.

GEARS AND GEAR CUTTING
American Adamite Co., The, 410 Oliver Bldg., Pittsburgh, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y.
Grant Gear Works, Second and B Sts., Boston, Mass.
Johnson, Carlyle, Machine Co., The, Manchester, Conn.
Mackintosh-Hemphill Co., Penn Ave., at Water Sts., Pittsburgh, Pa.
Simonds Mfg. Co., 25th St. and Liberty Ave., Pittsburgh, Pa.

GENERATING SETS
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.

GENERATORS (Acetylene) — See ACETYLENE GENERATORS

GENERATORS (Electric)
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Coit Rd. and Kirby Ave., Cleveland, O.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

GLOVES (Asbestos)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

GOGGLES (Welding)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

GRATING (Non-Slipping)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.

GREASES
Texas Co., The, 17 Battery Place, New York City

GRINDERS (Electric-Pneumatic Portable)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Independent Pneumatic Tool Co., 228 So. Jefferson St., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.

GRINDERS (Radial)
Mummert-Dixon Co., Hanover, Pa.

GRINDERS (Roll)
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y.
Norton Co., Worcester, Mass.

GRINDING MACHINES
Farrell-Cheek Steel Foundry Co., Sandusky, O.
Heald Machine Co., Worcester, Mass.
Norton Co., Worcester, Mass.

GRINDING PANS
Phillips & McLaren Co., 24th & Smallman Sts., Pittsburgh, Pa

GRINDING WHEELS
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

GUARDS (Machinery)
Breese Bros. Co., The, 2347 Reading Rd., Cincinnati, O.

HAMMERS (Air)
Nazel Engineering & Machine Works, 4100 W. 5th St., Philadelphia, Pa.

HAMMERS (Board Drop)
Erie Foundry Co., Erie, Pa.

HAMMERS (Chipping, Riveting and Calking)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Independent Pneumatic Tool Co., 228 So. Jefferson St., Chicago, Ill.
Ingersoll-Rand Co., 11 Broadway, New York City

HAMMERS (Drop)
Bliss, E. W., Co., 53rd and 2nd Ave., Brooklyn, N. Y.
Erie Foundry Co., Erie, Pa.
Morgan Engineering Co., Alliance, Ohio.
Toledo Machine & Tool Co., Toledo, O.

HAMMERS (Forging)
Nazel Engineering & Machine Works, 4100 W. 5th St., Philadelphia, Pa.

HAMMERS (Power)
Erie Foundry Co., Erie, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

HAMMERS (Steam)
Erie Foundry Co., Erie Pa.
Morgan Engineering Co., Alliance, Ohio.

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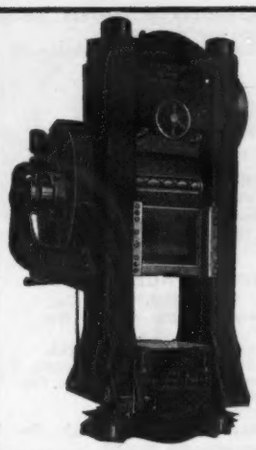

The "Toledo" Knuckle-Joint Embossing and Coining Presses

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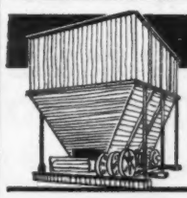

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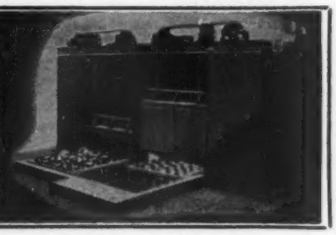

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Treadwell Engineering Co., Easton, Pa.

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Harnishfeger Corp., 3811 National Ave., Milwaukee, Wis.
Milwaukee Electric Crane & Hoist Corp., 60th & Greenfield Ave., Milwaukee, Wis.
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Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

HOISTS (Monorail)
Milwaukee Electric Crane & Hoist Corp., 284 7th Ave., Milwaukee.

HOISTS (Pneumatic)
Hanna Engineering Works, 1766 Elston Ave., Chicago, Ill
Independent Pneumatic Tool Co., 228 So. Jefferson St., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.

HOISTS (Portable)
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Ryerson, Joseph T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Sharon Steel Hoop Co., Sharon, Pa.
West Leechburg Steel Co., Farmers Bk. Bldg., Pittsburgh.

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Treadwell Engineering Co., Easton, Pa.

HOT BLAST STOVES
McKee, Arthur G., & Co., 2422 Euclid Ave., Cleveland, O.

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Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

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United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.
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Lockhart Iron & Steel Co., Pittsburgh, Pa.
Wrought Iron Co. of America, Lebanon, Pa.

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Bethlehem Steel Co., Bethlehem, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Penn Iron & Steel Co., Creighton, Pa.

IRON (Engine Bolt)
Bethlehem Steel Co., Bethlehem, Pa.
Penn Iron & Steel Co., Creighton, Pa.
Wrought Iron Co. of America, Lebanon, Pa.

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Rustless Iron Corp. of America, Chanin Bldg., 122 E. 42nd St., New York City.

IRON (Silvery)
Globe Iron Co., Jackson, O.

IRON Stainless)
Firth-Sterling Steel Co., McKeesport, Pa.

IRON (Staybolt)
Bethlehem Steel Co., Bethlehem, Pa.
Lockhart Iron & Steel Co., Pittsburgh, Pa.
Penn Iron & Steel Co., Creighton, Pa.
Wrought Iron Co. of America, Lebanon, Pa.

IRON ORE
Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland, O.
Hanna, The M. A., Co., Leader Bldg., Cleveland, O.
Hillman Coal & Coke Co., First National Bank Bldg., Pittsburgh, Pa.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Quinn, Clement K., & Co., Duluth, Minn.

KEROSENE
Texas Co., The, 17 Battery Place, New York City.

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Morton Mfg. Co., Muskegon, Mich.

KEYWAY CUTTERS (Stationary and Portable)
Morton Mfg. Co., Muskegon, Mich.

KNIVES AND SHEAR BLADES—See SHEAR BLADES AND KNIVES

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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.

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Lewis Foundry & Machine Co., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.

LATHES (Vertical Turret)
Bullard Co., The, Bridgeport, Conn.

LATHE DOGS
West Steel Casting Co., 805 E. 70th St., Cleveland, O.

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Lovsey, Charles H., Co., 704 Park Bldg., Pittsburgh, Pa.

LEAD BURNING APPARATUS (Oxy-Acetylene)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

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Farrell-Cheek Steel Foundry Co., Sandusky, O.

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Aetna-Standard Engineering Co., The, Youngstown, Ohio.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

LIFTING MAGNETS—See MAGNETS (Lifting)

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

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American Nut & Bolt Fastener Co., The, 2029 Doerr St., Pittsburgh.
Beall Tool Co., East Alton, Ill.
Mansfield Lock Washer Co., Mansfield, Ohio.
National Lock Washer Co., The, 40 Hermon St., Newark, N. J.
Positive Lock Washer Co., The, Ave. A. & Miller St., Newark, N. J.
Reliance Mfg. Co., The, Massillon, Ohio.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES (Electric)
Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Whitcomb, Geo. D., Co., Rochelle, Ill.

LOCOMOTIVES (Gasoline)
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Hanna Engineering Works, 1766 Elston Ave., Chicago, Ill
Johnson, Carlyle, Machine Co., The Manchester, Conn.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa

MAGNETIC SEPARATORS—See SEPARATORS (Magnetic)

MAGNETS (Lifting)
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O
Ohio Electric & Controller Co., 5900 Maurice Ave., Cleveland, O.

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General Refractories Co., 106 S. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bk. Bldg., Pittsburgh

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American Manganese Steel Co., Chicago Heights, Ill.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York City.

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Lavino, E. J., & Co., Bullitt Bldg., Philadelphia, Pa
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

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Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Webster & Weller Mfg. Co's., 1856 No. Kostner Ave., Chicago.

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Ford, The J. B., Co., Wyandotte, Mich.

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METAL WORKING MACHINES—See SHEET METAL WORKING MACHINERY

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Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.

MOLDS (Ingot)—See INGOT MOLDS

MONEL METAL
International Nickel Co., 67 Wall St., New York City.

MONORAIL SYSTEMS
Box Crane & Hoist Corp., Janney & E. Ontario St., Philadelphia.
Cleveland Electric Tramrail, Division of the Cleveland Crane & Engineering Co., Wickliffe, O.

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Century Electric Co., 1806 Pine Ave., St. Louis, Mo.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Coit Rd. and Kirby Ave., Cleveland, O.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

MUCK BAR
Bethlehem Steel Co., Bethlehem, Pa.
Samuel, Frank, & Co., Harrison Bldg., Philadelphia, Pa.

NAILS
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., P. O. Box 72, Pittsburgh, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

NAILS (Coated and Galvanized
American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Youngstown Sheet & Tube Co., The, Youngstown, O.

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International Nickel Co., 67 Wall St., New York City.

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Bethlehem Steel Co., Bethlehem, Pa.

NITROGEN (Gas)
Linde Air Products Co., 30 E 42nd St., New York City.

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Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Milldale, Conn.
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.
Cleveland Wrought Products Co., The, 3590 E. 58th St., Cleveland.
Foster Bolt & Nut Mfg. Co., Union Ave., at E. 72nd St., Cleveland, O.
Lake Erie Bolt & Nut Co., 915 E. 63rd St., Cleveland, O.
Neely Nut & Bolt Co., 2101 Wharton St., Pittsburgh.
Oliver Iron & Steel Corp., S. 10th and Muriel Sts., Pittsburgh, Pa.
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Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Co., 220 Mill St., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Wrought Iron Co. of America, Lebanon, Pa.

OIL CUPS
Gits Bros. Mfg. Co., 1940 S. Kilbourne Ave., Chicago, Ill.

OILS AND GREASES
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Koppers Construction Co., The, 1301 Koppers Bldg., Pittsburgh.

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Chateaugay Ore & Iron Co., 26 Liberty St., New York City.
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Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Eaton, Rhodes & Co., First National Bank Bldg., Cincinnati, O.
Globe Iron Co., Jackson, O.
Hanna, The M. A., Co., Leader Bldg., Cleveland, O.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Pickands, Mather & Co., Union Trust Bldg., Cleveland, O.
Pilling & Co., Inc., 1500 Chestnut St., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York.
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Valley Mould & Iron Corp., Hubbard, Ohio.

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Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Wemlinger, Inc., 149 Broadway, New York City.

PINIONS—See GEARS AND GEAR CUTTING

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Duriron Co., Inc., The, Dayton, O.

PIPE (Brass, Bronze and Copper)
American Brass Co., 25 Broadway, New York City.

PIPE (Seamless Steel and Seamless Iron)
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National Tube Co., Frick Bldg., Pittsburgh, Pa.
Petroleum Iron Works Co., The, Sharon, Pa.
Pittsburgh Steel Products Co., Union Trust Bldg., Pittsburgh.
Republic Iron & Steel Co., Youngstown, O.
Sharon Tube Co., Sharon, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

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Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

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Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City Steel Co., The, Granite City, Ill.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1219 Wabansia Ave., Chicago, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Ryerson, Joseph T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES (Terne and Tin)—See TIN PLATE

PNEUMATIC TOOLS—See TOOLS—(Pneumatic)

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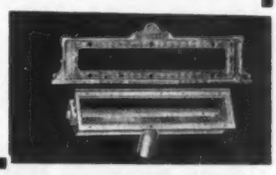

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POTS (Salt, Lead, Cyanide)
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POWDERED COAL EQUIPMENT
Combustion Engineering Corp., 200 Madison Ave., New York City.
Fuller-Lehigh Co., Fullerton, Pa.

PREHEATERS
Babcock & Wilcox Co., 85 Liberty St., New York City.
Blaw Knox Co., 602 Farmers Bank Bldg., Pittsburgh, Pa.
Combustion Engineering Corp., 200 Madison Ave., New York City.

PREHEATING APPARATUS
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

PRESSED METAL—See STAMPINGS

PRESSED STEEL PARTS — See STAMPINGS

PRESSES
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Erie Foundry Co., Erie, Pa.
Logeman Bros. Co., 3126 Burleigh St., Milwaukee, Wis.
Niagara Machine & Tool Works, 685 Northland Ave., Buffalo, N. Y.
Toledo Machine & Tool Co., Toledo, O.

PRESSES (Die Cutting)
Logemann Bros., Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Forging)
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh.

PRESSES (Hydraulic)
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Farrel-Birmingham Co., Inc., 344 Vulcan St., Buffalo, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

PRESSES (Metal Drawing, Etc.)
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.

PRESSES (Scrap Bundling and Baling)
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

PRESSES (Straightening)
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh.

PRODUCER GAS SYSTEMS—See GAS PRODUCER PLANTS

PULVERIZING, CRUSHING & GRINDING MACHINERY — See CRUSHING, GRINDING & PULVERIZING MACHINERY

PUMPS
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago.

PUMPS (Acid Resisting)
Duriron Co., Inc., The, Dayton, Ohio.

PUMPS (Air Lift)
Sullivan Machinery Co., 820 Wrigley Bldg., Chicago, Ill.

PUMPS (Boiler Feed)
Ingersoll-Rand Co., (Cameron), 11 Broadway, New York City.

PUMPS (Centrifugal)
Ingersoll-Rand Co., (Cameron), 11 Broadway, New York City.

PUMPS (Hand and Power)
Myers, F. E., & Brothers Co., The, Ashland, O.

PUMPS (Hydraulic)
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

PUMPS (Steam)
Ingersoll-Rand Co., (Cameron), 11 Broadway, New York City.

PUMPS (Vacuum & Dry)
Sullivan Machinery Co., 820 Wrigley Bldg., Chicago, Ill.

PUNCHES (Multiple)
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.

PUNCHING AND SHEARING MACHINERY
Beatty Machine & Mfg. Co., Hammond, Ind.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Long & Allstatter Co., Hamilton, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

PURIFIERS (Steam)
Blaw-Knox Co., 602 Farmers Bank Bldg., Pittsburgh.

RAILS
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.

RAILS (Girder)
Bethlehem Steel Co., Bethlehem, Pa.

REFRACTORIES
Babcock & Wilcox Co., 85 Liberty St., New York City.
Carborundum Co., The, Perth Amboy, N. J.
Climax Fire Brick Co., Climax, Pa.
Evens & Howard Fire Brick Co., 920 Market St., St. Louis, Mo.
General Refractories Co., 106 S. 16th St., Philadelphia, Pa.
Harbison-Walker Refractories Co., Farmers Bk. Bldg., Pittsburgh.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Kier Fire Brick Co., Oliver Bldg., Pittsburgh, Pa.
Laclede-Christy Clay Products Co., Ambassador Bldg., St. Louis, Mo.
Lavino, E. J., Co., Bullitt Bldg., Philadelphia, Pa.
North American Refractories Co., 1012 National City Bank, Cleveland, Ohio.
Norton Co., Worcester, Mass.
Stowe-Fuller Refractories Co., The, 1650 Union Trust Bldg., Cleveland, O.
Taylor, Chas., Sons Co., The, 715 Burns St., Cincinnati, O.
U. S. Refractories Corp., Mt. Union, Pa.

REGISTERS (Heating and Ventilating)
Auer Register Co., The, 3608 Payne Ave., Cleveland, O.

REGULATORS (Compressed Gas)
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

REGULATORS (Pressure)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland.

RHEOSTATS
Electric Controller & Mfg. Co., 2698 E. 79th St. Cleveland, O.

RINGS (Weldless)
Milwaukee Forge & Machine Co., Milwaukee, Wis.

RIVETERS (Pneumatic)
Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Hanna Engineering Works, 1766 Elston Ave., Chicago, Ill.

RIVETING MACHINERY
Hanna Engineering Works, 1766 Elston Ave., Chicago, Ill.
Shuster, The F. B., Co., New Haven, Conn.
Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

RIVET SETS
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.

RIVET SETS AND CHISEL BLANKS
Cleveland Wrought Products Co., The, 3590 E. 58th St., Cleveland.
Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

RIVETS
Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago.
Neely Nut & Bolt Co., 2101 Wharton St., Pittsburgh.
Oliver Iron & Steel Corp., S. 10th and Muriel Sts., Pittsburgh.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Joseph T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Wrought Iron Co. of America, Lebanon, Pa.

ROCK WOOL
General Insulating & Mfg. Co., Alexandria, Ind.

RODS (Brass, Bronze, Copper and Nickel Silver)
American Brass Co., 25 Broadway, New York City.

RODS (Drill)
Globe Wire Co., Sharpsburg, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

RODS (Iron and Steel)
Bethlehem Steel Co., Bethlehem, Pa.

RODS (Rounds, Flats & Shapes)
Washburn Wire Co., Phillipsdale, R. I.

RODS (Welding)—See WELDING RODS

ROLLING DOORS AND SHUTTERS
Kinnear Manufacturing Co., 815-868 Field Ave., Columbus, O.
Moeschl-Edwards Const. Co., The, 120 W. 9th St., Covington, Ky

ROLLING MILL BEARINGS
Hyatt Roller Bearing Co., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.

ROLLING MILL EQUIPMENT
Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & 2nd Ave., Brooklyn, N. Y.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., Pittsburgh, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., Alliance, O.
National Roll & Foundry Co., Avonmore, Pa.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

ROLLING MILLS (Consulting Engineers)
Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

ROLLING MILLS (Contracting Engineers)
McKee, Arthur G., & Co., 2423 Euclid Ave., Cleveland, O.

ROLLS (Galvanizing)
Heppenstall Forge & Knife Co., 47th and Hatfield, Pittsburgh.

ROLLS (Sand and Chilled)
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Duquesne Steel Foundry Co., Union Bank Bldg., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.

ROLLS (Steel)
American Adamite Co., The, 410 Oliver Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Duquesne Steel Foundry Co., Union Bank Bldg., Pittsburgh, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Mackintosh-Hemphill Co., Penn Ave. at Water Sts., Pittsburgh, Pa.
Mesta Machine Co., P. O. Box 1124, Pittsburgh, Pa.
Midvale Co., The Nicetown, Philadelphia, Pa.
National Roll & Foundry Co., Avonmore, Pa.
Pittsburgh Rolls Corp., 41st St. and A. V. R. R., Pittsburgh, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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ERIE, PA.

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American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Central Alloy Steel Corp., Massillon, Ohio.
Empire Steel Corp., Mansfield, Ohio.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Republic Iron & Steel Co., Youngstown, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROOFS (Open Hearth & Heating Furnaces)
Detrick, M. H., Co., 140 S. Dearborn St., Chicago.

RUSTLESS IRON
Rustless Iron Corp. of America, Chanin Bldg., 122 E. 42nd St., New York City.

RUST REMOVING COMPOUND
American Chemical Paint Co., Ambler, Pa.

SAFE ENDS (Boiler Tube)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

SAFETY DEVICES (Electric)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

SAND (Molding)
Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York.

SAND—SILICA (Furnace Bottom & Hot Top)
Industrial Silica Corp., 602 Stambaugh Bldg., Youngstown, Ohio.

SAND—SILICA (Steel Molding, Core, Sandblast)
Industrial Silica Corp., 602 Stambaugh Bldg., Youngstown, Ohio.

SAND BLAST ABRASIVE (Shot and Grit)
Pittsburgh Crushed Steel Co., 61st & A. V. R. R., Pittsburgh, Pa.

SANDBLAST EQUIPMENT AND ACCESSORIES
Pangborn Corp., P. O. Box 858, Hagerstown, Md.

SAND CONDITIONING AND PREPARING MACHINERY
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The, 2541 No. Keeler Ave., Chicago, Ill.
National Engineering Co., 549 W. Washington Blvd., Chicago, Ill.

SAND CONVEYING AND HANDLING MACHINERY
Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.
Beardsley & Piper Co., The, 2541 N. Keeler Ave., Chicago, Ill.
Link-Belt Co., 300 W. Pershing Road, Chicago, Ill.
National Engineering Co., 549 W. Washington Blvd., Chicago.

SAND SLINGERS
Beardsley & Piper Co., 2541 N. Keeler Ave., Chicago, Ill.

SASH (Steel)
Truscon Steel Co., Youngstown, Ohio.

SAW SHARPENING MACHINES
Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SAWS (Cold & Hot Metal)
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh.

SAWS (High Speed Cut-Off Machines)
Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SAWS (Hot & Cold, Tube & Rail)
Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SAWS (Inserted Tooth)
Hunter Saw & Machine Co., 5656 Butler St., Pittsburgh, Pa.

SAWS (Metal Cutting Power)
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
United Engineering & Foundry Co., Farmers Bank Bldg., Pittsburgh.

SCALES (Dial)
Buffalo Scale Co., 1200 Niagara St., Buffalo, N. Y.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

SCALES (Industrial, Motor Truck, Railroad Track, Rolling Mill)
Buffalo Scale Co., 1200 Niagara St., Buffalo, N. Y.
Fairbanks, Morse & Co., 900 So. Wabash Ave., Chicago, Ill.

SCALES—AUTOMATIC DIAL (Heavy Duty, Bench, Overhead Track, Tank, Hanging, Packing, Counting, Special Purposes)
Buffalo Scale Co., 1200 Niagara St., Buffalo, N. Y.
Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill.

SCLEROSCOPE, HARDNESS MEASURING
Shore Instrument & Mfg. Co., Van Wyck Ave. and Carll St., Jamaica, N. Y.

SCRAP BALING PRESSES
Logemann Bros., Co., 3126 Burleigh St., Milwaukee, Wis.

SCREENS AND SIEVES
Chicago Perforating Co., 2445 W. 24th Place, Chicago, Ill.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Harrington & King Peforating Co., 5634 Fillmore St., Chicago.
Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.
Mundt, Chas., & Sons, Johnston and Fairmount Aves., Jersey City, N. J.

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SCREW MACHINE PRODUCTS
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National Acme Co., E. 131st St. and Colt Rd., Cleveland.

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Economy Engineering Co., The, Willoughby, O.

SCREW STOCK
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SCREWS
Clark Bros. Bolt Co., Milldale, Conn.
Pittsburgh Screw & Bolt Co., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Conn.

SCREWS (Cap, Set and Safety)
Allen Mfg. Co., Hartford, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.
Cleveland Wrought Products Co., The, 3590 E. 58th St., Cleveland.
Foster Bolt & Nut Mfg. Co., Union Ave. at E. 72nd St., Cleveland, O.
Rhode Island Tool Co., Providence, R. I.

SCREWS (Cold Headed)
Cleveland Cap Screw Co., The, 2921 E. 79th St., Cleveland, O.
Cleveland Wrought Products Co., The, 3590 E. 58th St., Cleveland.
Foster Bolt & Nut Mfg. Co., Union Ave. at E. 72nd St., Cleveland, O.

SCREWS (Lag)
Foster Bolt & Nut Mfg. Co., Union Ave. at E. 72nd St., Cleveland, O.
Kirk-Latty Co., 1917 W. 85th St., Cleveland, O.
Lamson & Sessions Co., The, 2188 Scranton Rd., Cleveland, O.

SEAMLESS STEEL TUBING—See TUBES (Cold Drawn Seamless Steel)

SEPARATORS (Magnetic)
Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.
Ohio Electric & Controller Co., 5900 Maurice Ave., Cleveland, O.

SHAFT AND PIPE STRAIGHTENERS (Hydraulic)
Logemann Brothers Co., 3126 Burleigh St., Milwaukee, Wis.

SHAFT HANGERS
Hyatt Roller Bearing Co., Newark, N. J.

SHAFTING
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS—See PLANERS AND SHAPERS

SHAPERS (Heavy Duty Draw-Cut)
Morton Mfg. Co., Muskegon, Mich.

SHAPES (Steel)—See STEEL (Structural)

SHEAR BLADES AN KNIVES
Heppenstall Forge & Knife Co., 47th and Hatfield, Pittsburgh, Pa.

SHEARS
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Beatty Machine & Mfg. Co., Hammond, Ind.
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Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Lewis Foundry & Machine Co., Farmers Bank Bldg., Pittsburgh, Pa.
Manning, Maxwell & Moore, Inc. 100 E. 42nd St., New York City.
Morgan Engineering Co., Alliance, O.
National Roll & Foundry Co., Avonmore, Pa.
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Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago. Ill.
Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.
Toledo Machine & Tool Co., Toledo, O.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

SHEET BARS
Bethlehem Steel Co., Bethlehem, Pa.
Hausman & Wimmer Co., The, Clark Bldg., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEET METAL PRODUCTS—See STAMPINGS

SHEET METAL WORK
Crosby Co., The, 183 Pratt St., Buffalo, N. Y.

SHEET METAL WORKING MACHINERY
Bliss, E. W., Co., 53rd St. and 2nd Ave., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland, O.
Niagara Machine & Tool Works, 685 Northland Ave., Buffalo, N. Y.
Toledo Machine & Tool Co., Toledo, O.

SHEETS (Acid Resisting)
Duriron Co., Inc., The, Dayton, O.

SHEETS (Black)
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Eastern Rolling Mill Co., Baltimore, Md.
Empire Steel Corp., Mansfield, O.
Granite City Steel Co., The, Granite City, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Newton Steel Co., Youngstown, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Seneca Iron & Steel Co., P. O. Box 485, Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Blue Annealed)
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Corp., San Francisco, Calif.
Empire Steel Corp., Mansfield, Ohio.
Granite City Steel Co., The, Granite City, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Newton Steel Co., Youngstown, O.
Ryerson, Jos T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Sharon Steel Hoop Co., Sharon, Pa.
Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.
Tennessee Coal, Iron & Railroad Co., 1351 Brown-Marx Bldg., Birmingham, Ala.

SHEETS (Brass, Bronze, Copper and Nickel Silver)
American Brass Co., 25 Broadway, New York City.
Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.

SHEETS (Deep Drawing and Stamping)
American Rolling Mill Co., Middletown, Ohio.

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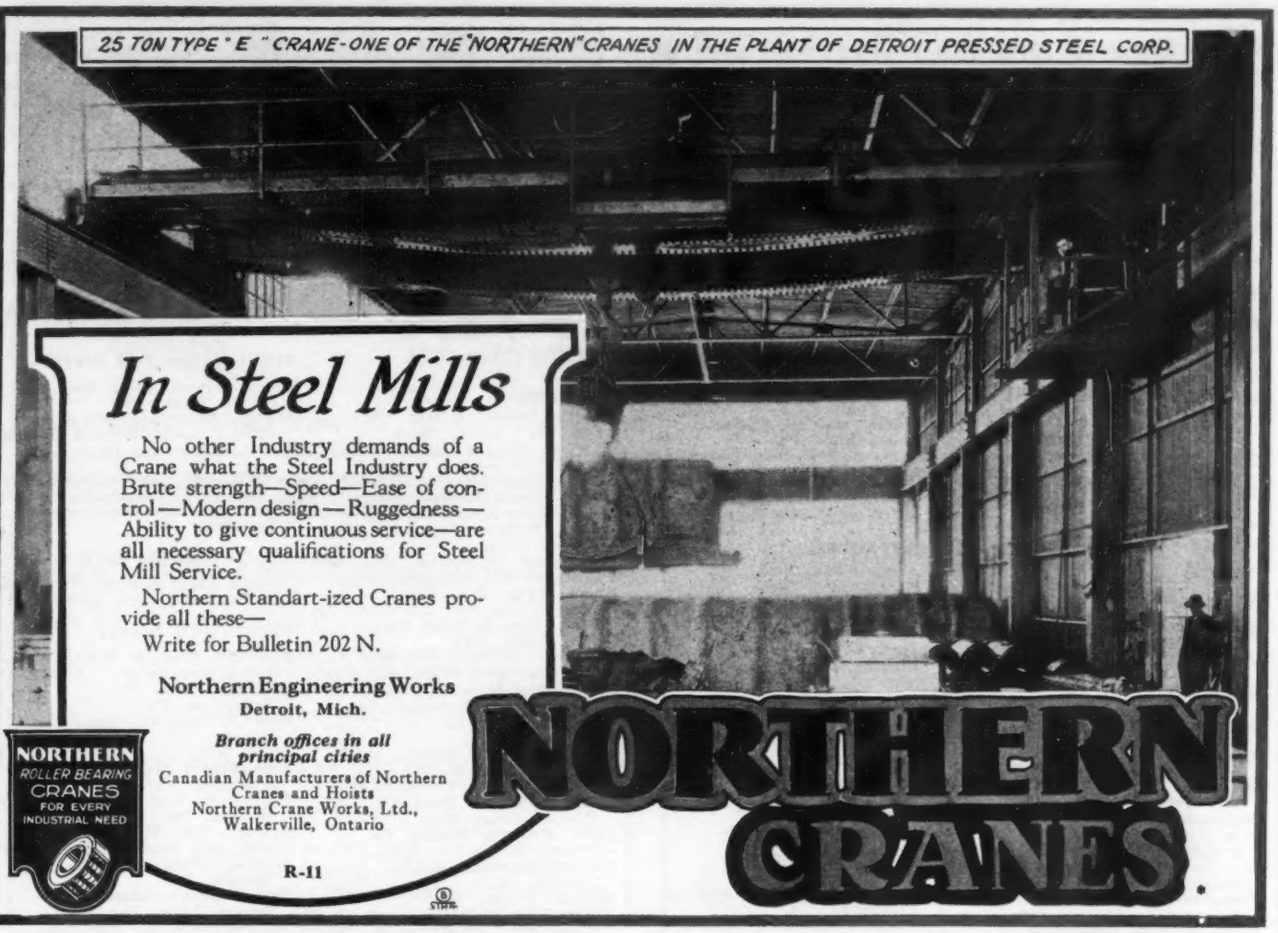

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Central Alloy Steel Corp., Massillon, O.
Eastern Rolling Mill Co., Baltimore, Md.
Empire Steel Corp., Mansfield, Ohio.
Granite City Steel Co., The, Granite City, Ill.
Newton Steel Co., Youngstown, O.
Republic Iron & Steel Co., Youngstown, O.
Seneca Iron & Steel Co., P. O. Box 485, Buffalo, N. Y.
Sharon Steel Hoop Co., Sharon, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Electrical)

American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Empire Steel Corp., Mansfield, Ohio.
Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.

SHEETS (Galvanized)

American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Granite City Steel Co., The, Granite City, Ill.
Inland Steel Co., First National Bank Bldg., Chicago, Ill.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS (Lead Coated)

Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.

SHEETS (Perforated)

Erdle Perforating Co., 171 York St., Rochester, N. Y.

SHEETS (Roofing)—See ROOFING AND SIDING (Corrugated and Plain)

SHEETS (Tin)—See TIN PLATE

SHEETS (Tin Mill Black)

Empire Steel Corp., Mansfield, Ohio.
Granite City Steel Co., Granite City, Ill.
Sheet Steel Trade Extension Com., The, Terminal Tower, Cleveland.
Weirton Steel Co., Weirton, W. Va.

SHEETS—HIGH FINISH (Automobile, Metal Furniture, Enameling)

Allegheny Steel Co., Brackenridge, Pa.
American Rolling Mill Co., Middletown, O.
American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Central Alloy Steel Corp., Massillon, Ohio.
Eastern Rolling Mill Co., Baltimore, Md.
Empire Steel Corp., Mansfield, Ohio.
Newton Steel Co., Youngstown, Ohio.
Seneca Iron & Steel Co., P. O. Box 485, Buffalo, N. Y.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

SHELVING (Steel Adjustable)

Cleveland Wire Spring Co., The, 1261 E. 38th St., Cleveland, O.

SHIPBUILDING SHAPES

Bethlehem Steel Co., Bethlehem, Pa.

SIEVES—See SCREENS & SIEVES

SILICO-MANGANESE

Vanadium Corp. of America, 120 Broadway, New York City.

SINTERING PLANTS

Greenawalt, John E., 110 E. 42nd St., New York City.

SKIP HOISTS

Bartlett, C. O., & Snow Co., 6203 Harvard Ave., Cleveland, O.

SLABS

Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

SLITTERS (Gang)

Manning, Maxwell & Moore, Inc., 100 E. 42nd St., New York City.

SLOTTING MACHINES

Nazel Engineering & Machine Works, 4100 W. 5th St., Philadelphia, Pa.

SOAKING PIT COVERS

Detrick, M. H., Co., 140 S. Dearborn St., Chicago, Ill.

SOAKING PITS

Chapman-Stein Co., The, Mt. Vernon, Ohio.
Criswell, James, Co., Keenan Bldg., Pittsburgh, Pa.
Incandescent Heat Co., Ltd., The, Cornwall Rd., Smethwick, Birmingham, England.

SPACING TABLES

Thomas Spacing Machine Co., Fulton Bldg., Pittsburgh, Pa.

SPECIAL MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, O.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Lewis Foundry & Machine Co., Pittsburgh, Pa.
Morgan Engineering Co., Alliance, O.
National Roll & Foundry Co., Avonmore, Pa.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.

SPEED REDUCERS

Grant Gear Works, Second and B Sts., So. Boston, Mass.

SPIEGELEISEN

Rogers Brown & Crocker Bros., Inc., 21 E. 40th St., New York.

SPIKES

Bethlehem Steel Co., Bethlehem, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.

SPRING MAKING MACHINERY

Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS

Advance Spring & Wire Co., 1749 Carroll Ave., Chicago, Ill.
American Spiral Spring & Mfg. Co., Arsenal Station, Pittsburgh, Pa.
American Spring & Mfg. Co., Elm St., Holly, Mich.
American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Barnes, Wallace, Co., The, Bristol, Conn.
Barnes-Gibson-Raymond, Inc., 6400 Miller Ave., Detroit, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Cook Spring Division, The, Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Cuyahoga Spring Co., 10252 Berea Rd., Cleveland, O.
Duer Spring & Mfg. Co., Pittsburgh, Pa.
Gibson, Wm. D., Co., 1800 Clybourn Ave., Chicago, Ill.
Kokomo Spring Co., Kokomo, Ind.
Muehlhausen Spring Co., Logansport, Ind.
Peterson Spring Co., The, 1660 Beard Ave., Detroit, Mich.
Raymond Mfg. Co., Centre St., Corry, Pa.
Washburn Wire Co., Inc., 118th & Harlem River, New York.

SPRUE CUTTERS

Sauster, The F. B., Co., New Haven, Conn.

STACKS (Steel)

American Bridge Co., 71 Broadway, New York City.
Morgan Engineering Co., Alliance, O.

STAMPINGS

American Spring & Mfg. Co., Elm St., Holly, Mich.
American Tube & Stamping Plant, The, (The Stanley Works), Bridgeport, Conn.
Barnes-Gibson-Raymond, Inc., 6400 Miller Ave., Detroit, Mich.
Barnes, Wallace, Co., The, Bristol, Conn.
Bay State Stamping Co., 380 Chandler St., Worcester, Mass.
Breese Bros. Co., The, 2347 Reading Rd., Cincinnati, O.
Central Iron & Steel Co., Harrisburg, Pa.
Cleveland Wrought Products Co., The, 3590 E. 58th St., Cleveland.
Cook Spring Division, The, Barnes-Gibson-Raymond, Inc., Ann Arbor, Mich.
Crosby Co., The, 183 Pratt St., Buffalo, N. Y.
Cuyahoga Spring Co., 10252 Berea Rd., Cleveland, O.
General Pressed Steel Co., Newton Falls, Ohio.
Joliet Wrought Washer Co., Joliet, Ill.
Lansing Stamping Co., Lansing, Mich.
Stanley Works, The, New Britain, Conn.
Truscon Steel Co. (Pressed Steel Div.), Youngstown, O.

STAMPS, STEEL AND MARKING DIES

Schwerdtle Stamp Co., 39 Cannon St., Bridgeport, Conn.

STAPLES (Wire)

Titchener, E. H., & Co., Binghamton, N. Y.

STARTERS (Electric Motor)

Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, O.

STEEL

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh.
Kidd Drawn Steel Co., Aliquippa, Pa.
Pacific Coast Steel Co., Hunter-Dulin Bldg., San Francisco, Calif.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Superior Steel Corp., 3122 Grant Bldg., Pittsburgh, Pa.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
Babcock & Wilcox Tube Co., 85 Liberty St., New York City.
Bethlehem Steel Co., Bethlehem, Pa.
Central Alloy Steel Corp., Massillon, O.
Colonial Steel Co., Keystone Bldg., Pittsburgh, Pa.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., 104 S. Michigan Ave., Chicago
Ludlum Steel Co., Watervliet, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell St., Chicago, Ill.
Timken Roller Bearing Co., The, Canton, O.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.

STEEL (Alloy, Cold Drawn)

Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.

STEEL (Carbon)

Bethlehem Steel Co., Bethlehem, Pa.

STEEL (Case Hardened)

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh.

STEEL (Cold Drawn)

American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Globe Wire Co., Sharpsburg, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago.
Superior Steel Products Co., Monaca, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL (Crucible)

Colonial Steel Co., Keystone Bldg., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Electric)

Heppenstall Forge & Knife Co., 47th & Hatfield, Pittsburgh, Pa.
Ludlum Steel Co., Watervliet, N. Y.

STEEL (High Speed)

Carboloy Co., 350 Madison Ave., New York City.
Colonial Steel Co., Keystone Bldg., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL (Manganese)

American Manganese Steel Co., Chicago Heights, Ill.

STEEL (Nitrided)

Central Alloy Steel Corp., Massillon, Ohio.
Ludlum Steel Co., Watervliet, N. Y.

STEEL (Non-Corrosive)

Ludlum Steel Co., Watervliet, N. Y.

STEEL (Open Hearth)

Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh.
Timken Roller Bearing Co., The, Canton, O.
Washburn Wire Co., Phillipsdale, R. I.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above

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St. Louis, Mo.—E. C. Hanpeter, 513 Star Bldg.

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STEEL (Open-Hearth—Cold Drawn)

Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.

STEEL (Rustless)

Firth-Sterling Steel Co., McKeesport, Pa.
Ludlum Steel Co., Watervliet, N. Y.

STEEL (Screw Stock)

American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Superior Steel Products Co., Monaca, Pa.

STEEL (Special Analysis)

Timken Roller Bearing Co., The, Canton, Ohio.

STEEL (Spring)

American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Donner Steel Co., Inc., P. O. Box 1000, Buffalo, N. Y.

STEEL (Stainless)

Firth-Sterling Steel Co., McKeesport, Pa.

STEEL (Strip, Hot and Cold Rolled)

Acme Steel Co., 2840 Archer Ave., Chicago, Ill.
American Steel & Wire Co., 208 S. LaSalle St., Chicago, Ill.
American Tube & Stamping Plant, The, (The Stanley Works) Bridgeport, Conn.
Central Alloy Steel Corp., Massillon, O.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Oliver Iron & Steel Corp., Morris & Bailey Div., Oliver Bldg., Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago.
Stanley Works, The, New Britain, Conn.
Superior Steel Corp., 3122 Grant Bldg., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
West Leechburg Steel Co., Farmers Bank Bldg., Pittsburgh.

STEEL (Structural)

American Bridge Co., 71 Broadway, New York City.
Belmont Iron Works, 22nd & Washington Ave., Philadelphia.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
Eichleay, John, Jr., Co., So. 20th and Wharton, Pittsburgh, Pa.
Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
McClintic-Marshall Co., Oliver Bldg., Pittsburgh, Pa.
Ohio Structural Steel Co., The, Newton Falls, O.
Pacific Coast Steel Co., Hunter-Dulin Bldg., San Francisco, Calif.
Phoenix Iron Co., The, 20 So. 15th St., Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell St., Chicago.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Truscon Steel Co., Youngstown, Ohio.

STEEL (Tool)

Bethlehem Steel Co., Bethlehem, Pa.
Carboloy Co., 350 Madison Ave., New York City.
Colonial Steel Co., Keystone Bldg., Pittsburgh, Pa.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL (Tungsten Carbide)

Carboloy Co., 385 Madison Ave., New York City.

STEEL BUILDINGS—See BRIDGES, BUILDINGS AND VIADUCTS (Steel)

STEEL DOORS AND SHUTTERS —See DOORS & SHUTTERS (Steel, Fire & Rolling)

STEEL FABRICATORS—See BRIDGES, BUILDINGS AND VIADUCTS (Steel)

STEEL PLATE CONSTRUCTION

Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.
Pennsylvania Engineering Works, New Castle, Pa.
Petroleum Iron Works Co., The, Sharon, Pa.
Pollock, William B., Co., The, Youngstown, Ohio.
Riter-Conley Co., 1207 Oliver Bldg., Pittsburgh.
Steel Plate Products Co., Pottstown, Pa.

STEEL PLATES — See PLATES (Iron and Steel)

STEEL STAMPINGS—See STAMPINGS

STELLITE

Haynes Stellite Co., 30 E. 42nd St., New York City.

STEPS (Safety)

Hendrick Mfg. Co., 43 Dundaff St., Carbondale, Pa.

STOKERS

Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Combustion Engineering Corp., 200 Madison Ave., New York City.

STRAIGHTENING MACHINERY

Logemann Bros. Co., 3126 Burleigh St., Milwaukee, Wis.
Shuster, The F. B., Co., New Haven, Conn.
Sutton Engineering Co., Park Bldg., Pittsburgh, Pa.

STRIP MILLS (Hot or Cold)

Morgan Construction Co., Worcester, Mass.
Treadwell Engineering Co., Easton, Pa.

STRUCTURAL IRON AND STEEL WORK — See STEEL (Structural)

SULPHURIC ACID

Cleveland-Cliffs Iron Co., Union Trust Bldg., Cleveland.

SWITCH STANDS

Bethlehem Steel Co., Bethlehem, Pa.

SWITCHES (Electric)

Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

TANKS (Storage, Pressure, Riveted, Welded)

Air Tight Steel Tank Co., Mansion and Gloster St., Pittsburgh, Pa.
Petroleum Iron Works Co., The, Sharon, Pa.
Riter-Conley Co., 1207 Oliver Bldg., Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Oakmont, Pa.
Steel Plate Products Co., Pottstown, Pa.

TANKS—WOOD (For all Purposes)

Hauser Stander Tank Co., Cincinnati, O.

TANKS—WOOD OR STEEL (Rubber or Lead Lined)

Hauser Stander Tank Co., Cincinnati, O.

TAPS (Collapsible)

National Acme Co., E. 131st St. & Coit Rd., Cleveland, O.

TAPS AND DIES

Landis Machine Co., Waynesboro, Pa.

TERNE PLATE—See TIN PLATE

TESTING MACHINES

Riehle Bros. Testing Machine Co., 1224 No. 9th St., Philadelphia.

THREAD CUTTING TOOLS

Landis Machine Co., Waynesboro, Pa.

TIE PLATES

Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.

TIES (Creosoted)

Century Wood Preserving Co., 1738 Koppers Bldg., Pittsburgh.

TIN PLATE

American Sheet & Tin Plate Co., Frick Bldg., Pittsburgh, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Granite City Steel Co., The, Granite City, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

TIN PLATE MACHINERY

Aetna Standard Engineering Co., The, Youngstown, O.
Wean Engineering Co., Inc., The, 2nd Nat. Bank Bldg., Warren, O.

TITANIUM

Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

TOOL BITS (High Speed)

Firth-Sterling Steel Co., McKeesport, Pa.

TOOL BITS (Stellite)

Haynes-Stellite Co., 30 E. 42nd St., New York City.

TOOLS (Pneumatic)

Cleveland Pneumatic Tool Co., 3734 E. 78th St., Cleveland, O.
Ingersoll-Rand Co., 11 Broadway, New York City.

TORCHES AND BURNERS (Acetylene, Blow, Oxy-Acetylene)

Air Reduction Sales Co., 342 Madison Ave., New York City.
Oxweld Acetylene Co., 30 E. 42nd St., New York City.

TOWERS (Transmission)

American Bridge Co., 71 Broadway, New York City.
Pacific Coast Steel Co., Hunter-Dulin Bldg., San Francisco.

TRAMRAILS

Cleveland Electric Tramrail, Division of the Cleveland Crane and Engineering Co., Wickliffe, O.
Harnischfeger Corp., 3811 National Ave., Milwaukee, Wis.

TREADS (Safety Stair and Ladder) See GRATING (Non-Slipping)

TROLLEYS

Hanna Engineering Works, 1766 Elston Ave., Chicago, Ill.
Roeper Crane & Hoist Works, 1729 No. 10th St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

TRUCKS (Welding)

Oxweld Acetylene Co., 30 E. 42nd St., New York City.

TRUCKS AND TRACTORS (Electric Industrial)

Atlas Car & Mfg. Co., 1140 Ivanhoe Rd., Cleveland, O.

TRUCKS & TRACTORS (Gasoline, industrial)

Clark Tructractor Co., Battle Creek, Mich.

TUBE MILL MACHINERY

Aetna-Standard Engineering Co., The, Youngstown, O.
Mackintosh-Hemphill Co., Penn Ave. at Water Sts., Pittsburgh, Pa.
Treadwell Engineering Co., Easton, Pa.
United Engineering & Foundry Co., Farmers Bk. Bldg., Pittsburgh.

TUBES

Babcock & Wilcox Tube Co., 85 Liberty St., New York City.
Michigan Steel Tube Products Co., Holbrook and Buffalo Sts., Detroit, Mich.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Products Co., Union Trust Bldg., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Sharon Tube Co., Sharon, Pa.
Timken Roller Bearing Co., The, Canton, O.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBES (Alloy)

Allegheny Steel Co., Brackenridge, Pa.
Babcock & Wilcox Tube Co., 85 Liberty St., New York City.

TUBES (Boiler)

Babcock & Wilcox Tube Co., 85 Liberty St., New York.
Bethlehem Steel Co., Bethlehem, Pa.

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2		115 tons
5	WORM DRIVEN Ladle,	125 tons
44		125 tons
27		150 tons
2	WORM DRIVEN Ladle,	150 tons
3	WORM DRIVEN Ladle,	160 tons
2	WORM DRIVEN Ladle,	165 tons
3	WORM DRIVEN Ladle,	175 tons
27		175 tons
3	WORM DRIVEN Ladle,	200 tons
2		200 tons
1		225 tons
1		250 tons
3	WORM DRIVEN Ladle,	250 tons
1		275 tons
3		430 tons

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1		125 tons
21		150 tons
17		200 tons
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3		150 tons
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TUBES (Boiler)—Cont.

Giberson, E. D., & Co., Inc., 40 Rector St., New York City.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Products Co., Union Trust Bldg., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBES (Brass and Copper)

Wolverine Tube Co., 1411 Central Ave., Detroit, Mich.

TUBES (Charcoal Iron Boiler)

Bethlehem Steel Co., Bethlehem, Pa.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBES (Cold Drawn Seamless Steel)

Giberson, E. D., & Co., Inc., 40 Rector St., New York City.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Pittsburgh Steel Products Co., Union Trust Bldg., Pittsburgh.
Summerill Tubing Co., Bridgeport, Pa.
Timken Roller Bearing Co., The, Canton, O.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.

TUBES (Lap-Welded Boiler)

Bethlehem Steel Co., Bethlehem, Pa.
Tyler Tube & Pipe Co., The, Washington, Pa.

TUBES (Seamless Iron)

Babcock & Wilcox Tube Co., 85 Liberty St., New York City.

TUBES (Welded Steel)

Michigan Steel Tube Products Co., Buffalo St., Detroit, Mich.
Tubeweld, Inc., Oakland & Manchester Aves., Detroit, Mich.

TUNGSTEN CARBIDE

Carboloy Co., 350 Madison Ave., New York City.
Haynes Stellite Co., 30 E. 42nd St., New York City.
Ludlum Steel Co., Watervliet, N. Y.

TURBINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

TURBO BLOWERS — See BLOWERS

TURNBUCKLES

Merrill Brothers, Maspeth, N. Y.

TURNTABLES

American Bridge Co., 71 Broadway, New York City.

TWIST DRILLS—See DRILLS

VALVES (Back Pressure)

Oxweld Acetylene Co., 30 E. 42nd St., New York City.

VALVES (Gas)

Bailey, Wm. M., Co., Magee Bldg., Pittsburgh, Pa.

VALVES (Gas and Air Reversing)

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Duff Patents Co., Inc., 321 Union Trust Bldg., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.

VALVES (Hydraulic)

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Wood, R. D., & Co., 400 Chestnut St., Philadelphia, Pa.

VALVES (Pneumatic)

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VALVES AND FITTINGS

Pittsburgh Piping & Equipment Co., 43rd St. & A. V. R. R., Pittsburgh, Pa.

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Vanadium Corp. of America, 120 Broadway, New York City.

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WALKAWAYS (Open Steel — See FLOORING-STEEL (Ventilating, Nonslipping, Fireproof)

WALLS (Sectional Air Cooled)

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WAREHOUSES (Iron and Steel)

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Illinois Steel Warehouse Co., 1319 Wabansia Ave., Chicago, Ill.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., (Div. Columbia Steel & Shafting Co.), Pittsburgh, Pa.

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Beall Tool Co., East Alton, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Joliet Wrought Washer Co., Joliet, Ill.
Mansfield Lock Washer Co., Mansfield, Ohio.
National Lock Washer Co., The, 40 Hermon St., Newark, N. J.
Positive Lock Washer Co., The, Ave. A & Miller St., Newark, N. J.
Reliance Mfg. Co., The, Massillon, Ohio.

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WASHERS (Special)

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Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.
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International Oxygen Co., Newark, N. J.
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Washburn Wire Co., Phillipsdale, R. I.
Wilson Welder & Metals Co., Wilson Bldg., Hoboken, N. J.

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Carnegie Steel Co., 431 Carnegie Bldg., Pittsburgh, Pa.
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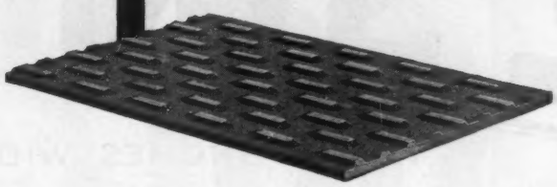

Section M-41

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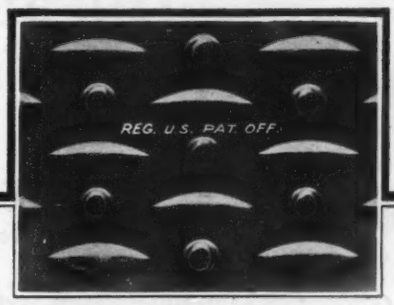

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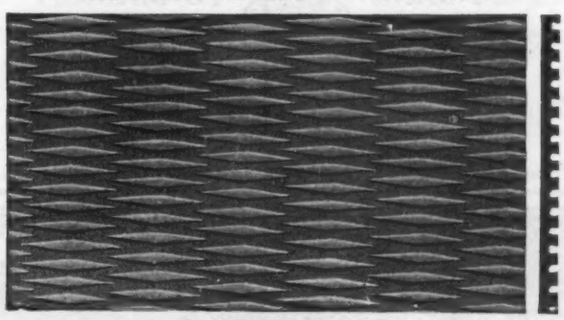

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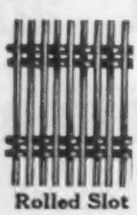
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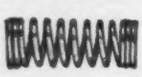

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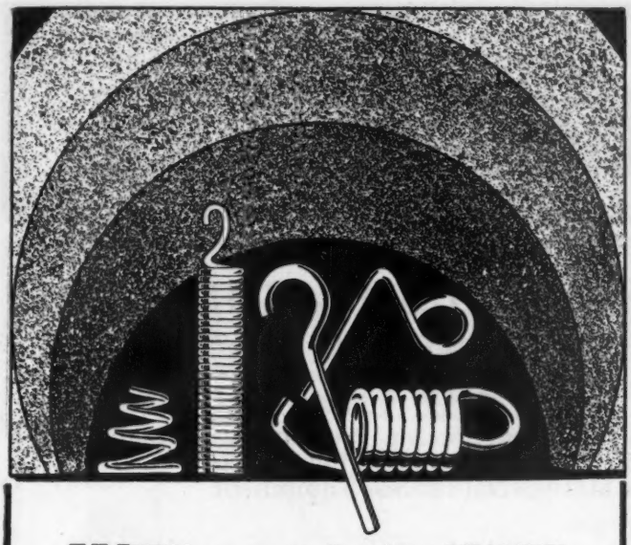

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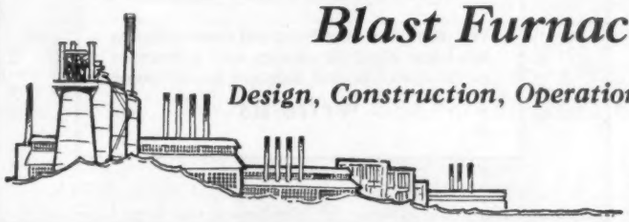

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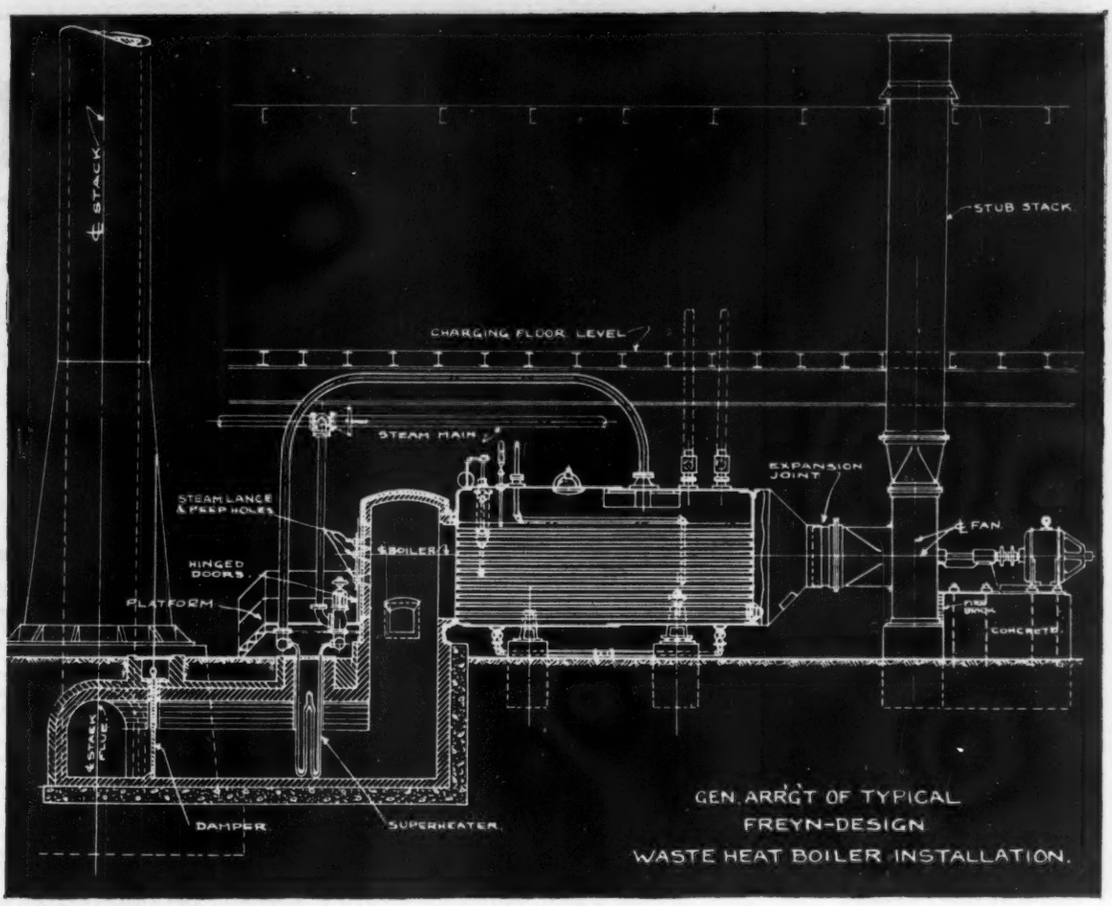

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Seven words of ordinary length make a line.

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One United Engineering and Foundry Company Alligator Shear—3" capacity.

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One Doelger & Kirsten No. 2 low-knife, 12" knife, left-hand, belt driven Shear.

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